

BULLETIN OF MISCELLANEOUS INFORMATION No. 4 1932 ROYAL BOTANIC GARDENS, KEW

XXI.—A REVISION OF THE GENUS *LEYCESTERIA*.

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NOMENCLATURE.

The genus *Leycesteria* was established by Nathaniel Wallich (in Roxb., Fl. Ind. ed. Carey & Wall. ii. 181: 1824), with a single species, *L. formosa*, at that time new to science. The generic name was given in honour of Wallich's "highly esteemed friend William Leycester, Esq., chief judge of the principal native court under the Bengal presidency" (Wallich, *l.c.* 182). The spelling was modified in 1828 by Reichenbach (Consp. 96) to *Leycesteria*, which is in accordance with Rec. IVb. of the International Rules, ed. 2 (1912), and in 1838 by Endlicher (Gen. 568) to *Leycesteria*,* possibly on the analogy of "Lancastria" (Lancaster). In 1855 Pritzl (Ic. Bot. Ind. i. 628) altered it to *Leicesteria*,† presumably on the ground that the letter "y" did not occur in Latin (except in words of Greek origin).‡ Although the form *Leycesteria* is intrinsically preferable, the original spelling *Leycesteria* must be retained under International Rules, ed. 2, Art. 57.

HISTORICAL : (A) THE GENUS.

Wallich regarded the genus as belonging to "the fifth section of *Rubiaceae* (Juss. in Mém. du Mus. vi. 398), connecting it with the family of *Caprifoliaceae*." He further remarked, "it comes nearest to *Hamellia*," but "by its connate bractes and persistent gemmaceous scales it approaches to *Caprifolium*." It is an interesting fact, though one of doubtful significance, that in K. Schumann's key to the *Rubiaceae* in Engler u. Prantl, Nat. Pflanzenf. iv. Abt. 4, *Leycesteria* would certainly run down to the immediate neighbourhood of the genus *Hamelia*, which Jussieu included in his fifth section; and Reichenbach (Consp. 96: 1828) actually included *Leycesteria* in *Rubiaceae*, tribe *Hameliaceae*. Achille Richard, however, writing in 1829, gave it as his opinion, based solely on Wallich's description, that *Leycesteria* belonged to the family *Caprifoliaceae* (Mém. Soc. Hist.

*This spelling also occurs in Wight, Illustr. Ind. Bot. ii. 70 (1850), but on p. 72 of the same work yet another variant is used, *viz.*, *Leycesteria*!

†Also in Wallich, Pl. As. Rar. ii. t. 120 (1831), but not in the text.

‡The form *Leucesteria* in Meisner, Pl. Vasc. Gen. ii. 360 (1837-43) is doubtless a misprint, since the original spelling is employed at i. 155 and ii. 111 of the same work. For a similar reason the spelling *Leycesteria*, occurring in Journ. As. Soc. Beng. xxxix. pt. 2, 77 (1870), is clearly a printer's error.

Nat. Paris, v. 292 : 1834) ; and Sprengel (Linn. Gen. Pl. ed. 9, i. 177) and De Candolle (Prodr. iv. 138) independently, in 1830, referred it to that family also. Endlicher (Gen. i. 568 : 1838) placed it beside *Lonicera* and *Diervilla*, and Bentham & Hooker (Gen. Pl. ii. 5 : 1873) and Fritsch (Engler & Prantl, Nat. Pflanzenf. iv. Abt. 4, 169 : 1891 ; including the genus *Pentaptyxis* Hook. fil.) retained it in the same position.

HISTORICAL : (B) THE SPECIES.

The genus remained monotypic for nearly half a century after its original description. In 1870, Sulpiz Kurz described a plant, from specimens sent to him from Sikkim by Anderson, under the name "*Lonicera (Leycesteria) gracilis*," adding : "It is a *Leycesteria*, a genus which, however, does not seem to me to differ from *Lonicera*" (Journ. As. Soc. Beng. xxxix. pt. 2, 77 : 1870). Kurz, therefore, whilst treating the genus *Leycesteria* merely as a section of *Lonicera*, nevertheless recognised that his species belonged to the same category (however designated) as that of Wallich. In view of what will appear later, it is of interest to read his suspicion as to the affinity of *L. gracilis*, expressed as follows : "I thought at first, I might compare this species with *L[onicera]. glaucophylla* H. f. and Th., but judging from the description only it differs in every respect."

In forming this opinion, Kurz showed shrewder judgment than did C. B. Clarke, who, in dealing with the *Caprifoliaceae* for the Flora of British India (iii. 1 : 1880), reduced *L. gracilis* Kurz to *Leycesteria glaucophylla* (Hook. fil. et Thoms.) comb. nov., attributing the new combination (based upon *Lonicera glaucophylla* Hook. fil. et Thoms.) to J. D. Hooker. The latter had previously (Gen. Pl. ii. 6 : 1873) referred *L. glaucophylla* to the genus *Pentaptyxis*, but without actually effecting the combination *P. glaucophylla*. Hooker seems to have decided subsequently that *Lonicera glaucophylla* was a *Leycesteria*, and to have informed C. B. Clarke verbally, since he neither published the new combination himself, nor wrote it on the type sheets in the Kew Herbarium. C. B. Clarke's mistake in uniting *L. gracilis* and *L. glaucophylla* was, however, based upon an earlier misidentification, for which the responsibility appears to rest upon either Hooker or Thompson or both. These two authors described their *Lonicera glaucophylla* (Journ. Linn. Soc. ii. 165 : 1858) from sterile leafy branchlets collected by the former in January 1849 at Yoksun,* near the base of Kinchinjunga, at about 1500 m. elevation. Thomson revisited the locality some years later and obtained flowering material of what he or Hooker took to be the same species (*L. glaucophylla*).† Fortunately, a small portion of one of Thomson's specimens was found in an envelope, labelled "Yoksun, Sikkim, T. Thomson, 1857" in Hooker's handwriting, attached to one of the latter's own type sheets of *L. glaucophylla* in the Kew Herbarium.

*Vide J. D. Hooker, Himal. Journ. i. 334 (1854).

†Vide Gard. Chron. & Agric. Gaz. [xviii.] 700 (1858).

Thomson's fragment is beyond doubt the *L. gracilis* of Kurz ; for, though it is possible to compare only the vegetative parts, the specimens of Hooker's *L. glaucophylla* possess an extremely characteristic indumentum on the under-surface of the leaves, which is very different from that seen in *L. gracilis*. Moreover the presence of stipules in *L. glaucophylla* and their absence in *L. gracilis* has since proved to be a constant point of distinction. A further discussion of the confusion in which these two species have been involved is given in the enumeration (*see* p. 173).

The next species to be added to the genus was *L. stipulata* Fritsch, comb. nov. (Engler u. Prantl, Nat. Pflanzenf. iv. Abt. 4, 169: 1891), based upon *Lonicera stipulata* Hook. fil. et Thoms. This species had also been referred to the genus *Pentaptyxis* by Hooker in the Genera Plantarum (*l.c.*, 1873), the actual combination *Pentaptyxis stipulata* Hook. fil. being published (ex C. B. Clarke) in the Flora of British India, iii. 17 (1880). Fritsch's reduction of *Pentaptyxis* to *Leycesteria* seems fully justified, the distinguishing characters relied upon by Hooker being insufficient to warrant its separation.

Leycesteria sinensis Hemsley was described and figured (Hook. Ic. Plant. xxvii. t. 2633 : 1900) from material collected by Henry in south-eastern Yunnan. It is a close ally of *L. formosa* and its taxonomic status has never been disputed.

In 1910, W. W. Smith collected in Sikkim and, a year later, described and figured (Trans. Proc. Bot. Soc. Edinb. xxiv. 173 : 1911) a supposed new species, *L. Belliana* W. W. Sm. It was stated to be very closely allied to *L. sinensis* Hemsl., but the fact that it possessed stipules suggested a comparison with the other stipulate species of the genus, and careful examination led to the interesting discovery that it was undoubtedly identical with *L. glaucophylla* (Hook. fil. et Thoms.) Hook. fil., *sensu stricto*. Flowering material of this species now being available, the differences between it and *L. gracilis* (Kurz) are immediately obvious.

During his extensive travels in China, 1910-1920, Dr. W. Limpricht collected a *Leycesteria*, which H. Winkler described (Fedde, Rep. Spec. Nov., Beih. xii. 493 : 1922) as a new species, *L. Limprichtii*. This has been found to be the same as *L. formosa* var. *stenosepala* of Rehder, who kindly furnished the writer with a photograph of the type-specimen of Winkler's species in Herb. Hort. Bot. Breslau. Limpricht collected his material in September 1914, some distance north of Ta-tsien-lu, in Szechuan, where, as Rehder remarks (*in litt.*), the var. *stenosepala* "seems to be the prevailing form."

The latest addition to the genus was collected by Capt. F. K. Ward in Assam in 1928, and is described below as *L. crocothyrsos*, sp. nov., the orange-coloured corollas being unique in the genus. Its affinity appears to be with *L. formosa*, but the presence of stipules at once distinguishes it. This is the third stipulate species of *Leycesteria* now known.

COMPARISON WITH OTHER CAPRIFOLIACEOUS GENERA.

Horne (Trans. Linn. Soc. ser. 2, viii. 251: 1914) has referred to *Leycesteria* as "the type genus of the family [Caprifoliaceae]," by which he apparently means the most primitive genus, that is, the genus showing least specialisation, at any rate in the flower. In *Leycesteria* the gynaecium is usually isomerous (5-locular), *L. gracilis* being the only species showing pleiomery in this respect. Other genera in which species occur with a 5-locular ovary are: *Lonicera* (Sect. *Nintooa*); *Sambucus* (varying to 3-locular; the genus is admittedly isolated and "un-typical" of the family); and *Triosteum* (in which the ovary is much more commonly 3-locular). The remaining genera show various degrees of locular abortion and/or suppression.

In *Leycesteria* all the loculi are multiovulate, and multiovulate or pluriovulate loculi are characteristic of all the other genera of the tribe *Lonicereae* (*sensu* Fritsch). This appears to be a primitive character. *Leycesteria* and *Diervilla* have many-seeded fruits, whereas the fruits in the remaining genera are few-seeded, a character which may be regarded as derivative.

Inflorescence. As Fritsch (Engler u. Prantl, Nat. Pflanzenf. iv. Abt. 4, 158: 1891) has indicated, the basic type of inflorescence in the *Caprifoliaceae* is the cyme. In the majority of genera the cymose arrangement has undergone modification, by the suppression either of the terminal flower or of the two lateral flowers of the cyme. *Leycesteria* is the only genus (except the monotypic *Heptacodium*) in which over 50 per cent. of the species have retained the 3-flowered cymose arrangement unmodified. *Lonicera* subgen. *Periclymenum* is characterised by the same arrangement, but the species of that subgenus constitute only about 17 per cent. of the genus as a whole; in the remainder the central flower of each cyme is suppressed. Four of the six known species of *Leycesteria* have the unmodified arrangement; the remaining two have lost the lateral flowers of the cyme, in the same manner as *Symphoricarpos* and most other genera of the *Linnaeëae* and *Lonicereae*. Indeed, the inflorescence of *Leycesteria gracilis* (Kurz) bears an extraordinarily close resemblance to that of *Symphoricarpos sinensis* Rehder (in Sargent, Pl. Wils. i. 117: 1911), the only known Asiatic representative of that genus.

Examination of the inflorescence in the series *L. formosa* (large coloured foliaceous bracts), *L. glaucophylla* (small green foliaceous bracts) and *L. gracilis* (very small non-foliaceous but herbaceous bracts), in which there is a progressive diminution in the size of the bracts, suggests the possibility that, within the genus *Leycesteria*, the number of flowers per inflorescence may have been increased by a gradual transformation of foliaceous leaves into bracts and the consequent union of several inflorescences into one.

Sommier's discussion (Nuov. Giorn. Bot. Ital. xxii. 217-227: 1890) of the taxonomic value of stipules in the *Caprifoliaceae* is interesting and suggestive. Special reference is made to *Leycesteria*

(*Pentaptyxis*) *stipulata* and to *Lonicera caerulea* L. forma *stipuligera* Somm. The occurrence of stipules in *Leycesteria* and *Lonicera* seems to be an unsuspected link between the two genera. More important still (as has, indeed, been pointed out before*), this character can no longer be used to distinguish absolutely the *Caprifoliaceae* from the *Rubiaceae*. In fact, the only character now remaining to separate these families is their respectively perulate and eperulate buds. (The genera *Alseuosmia* Cunn., *Pachydiscus* Gilg et Schltr. and *Memecylanthus* Gilg et Schltr., with eperulate buds, alternate leaves, valvate corolla-lobes, sometimes free stamens, and anomalous ovular orientation, should probably be excluded from *Caprifoliaceae*.—*Vide* Gilg u. Schlechter in Engler, Bot. Jahrb. xxxix. 268–70 : 1906).

ARRANGEMENT OF THE SPECIES.

The genus was subdivided by Fritsch (in Engler u. Prantl, Nat. Pflanzenf. iv. Abt. 4, 169 : 1891) into two sections, *Euleycesteria* Fritsch and *Pentaptyxis* (Hook. fil.) Fritsch, based upon the absence or presence respectively of pith in the stems, the usual absence or presence of stipules, and the zygomorphy or comparative actinomorphy of the corolla. This merely had the effect of separating *L. stipulata* from the remaining 3 species then recognized, and, though Fritsch was undoubtedly right in reducing *Pentaptyxis* to *Leycesteria*, his two subdivisions are scarcely satisfactory in the light of further investigation.

The problem of how best to group the six species is a peculiar one, owing to the unexpectedly great diversity of characters found among them. Two alternatives present themselves: either to leave the genus with no subdivisions at all, or else to make almost as many "groups" as there are species. If the genus be examined with characters in view similar to those employed by Rehder in his Synopsis of *Lonicera*, the second alternative at once appears as the only logical one. If the establishment of several monotypic sections, series, etc., in a small genus should evoke criticism as being a method of unnecessarily extreme analysis, the question might well be asked: What is there, either of science or of logic, in making use of certain criteria for classifying the members of a large genus (such as *Lonicera*), but refusing to make use of the same or equivalent criteria in systematizing an allied, but small, genus (as *Leycesteria*)?

The method of arrangement here proposed, therefore, seeks justification in that it may serve to indicate the peculiarly remote or disjointed nature of the interspecific relationships within the genus. The following is a conspectus.

Subgenus I. **Euleycesteria** (Fritsch *pro sect.*, *emend.*), subgen. nov.—Ovarium 5-loculare, glanduloso-pubescens. Pseudo-verticilli 6-flori, raro 2-flori. Bracteae plus minus late ovatae, ovario longiores. (Typus subgeneris, *L. formosa*.)

**Vide* Fritsch in Engl. u. Prantl, Nat. Pflanzenf. iv. Abt. 4, 157 (1891).

Sectio i. FISTULARIA sect. nov.—Foliorum paginae inferioris pubescentia e pilis sparsis rectis plus minus adpressis sistens. Rami subherbacei, manifeste fistulosi. (Typus sectionis, *L. formosa*.)

Series 1. *Formosae* ser. nov.—Stipulae haud evolutae. Corolla alba vel roseo-tincta, supra basin conicam in nectaria oblonga inconspicua paullum ampliata; stylus glaber. (Typus seriei, *L. formosa*.)

Inflorescentia 1-pseudo-verticillata.....1. *L. sinensis*

Inflorescentia 2-pluri-pseudo-verticillata.....2. *L. formosa*

Series 2. *Crocothyrsae* ser. nov.—Stipulae evolutae. Corolla laete flavo-aurantiaca, basi truncato-intrusa in sacculas 5 prominentes valde dilatata; stylus pubescens.....

3. *L. crocothyrsos*

Sectio ii. PENTAPYXIS (Hook. fil.) Fritsch, emend.—Foliorum paginae inferioris pubescentia e pilis sparsis vel lanuginosis plus minus crispulis vel erectis basibus ut videtur bulbosis sistens. Rami haud herbacei. Corolla ut in Serie 1. (Typus sectionis, *L. stipulata*.)

Series 3. *Stipulatae* ser. nov.—Rami medullosi. Inflorescentia e pseudo-verticillis 6-floris compluribus sistens. Stylus glaber.—Planta dense lanuginosa.....4. *L. stipulata*

Series 4. *Glaucophyllae* ser. nov.—Rami fistulosi. Inflorescentia e pseudo-verticillis 2-flori 1-2 tantum sistens. Stylus pubescens.—Planta pubescens.....5. *L. glaucophylla*

Subgenus II. **Paralestera** subgen. nov.—Ovarium 8-loculare, glaber. Pseudo-verticilli 2-flori. Bractee minimae, subulatae, ovario breviores.—Corolla ut in Seriebus 1, 3 et 4. Stylus glaber. Pubescentia ut in Sectione i.....6. *L. gracilis*

ARTIFICIAL KEY TO THE SPECIES.

Interpetiolar stipules absent (*cf.* also sp. 5) :

Flowers in pairs; bracts subulate, shorter than the glabrous ovary 6. *gracilis*

Flowers in sixes; bracts broadly ovate, longer than the glandular-pubescent ovary :

Inflorescence of 6 flowers only.....1. *sinensis*

Inflorescence of 2 or more false whorls of 6 flowers

2. *formosa*

Interpetiolar stipules present, sometimes very small (*vide* sp. 5) :

Leaves densely lanuginose beneath; style glabrous.....4. *stipulata*

Leaves pubescent beneath; style pubescent :

Flowers in pairs; corolla whitish.....5. *glaucophylla*

Flowers in sixes; corolla orange.....3. *crocothyrsos*

ENUMERATION.

1. **Leycesteria sinensis** Hemsley in Hook. Ic. Plant. xxvii. t. 2633 (1900); Rehder in Sargent, Pl. Wils. i. 312 (1912), in obs.

Icones. Hooker, *Icones Plantarum* xxvii. t. 2633 (1900).

CHINA: YUNNAN. Mountains to north of Mengtze, 2100 m., Henry 9692 c (*Herb. Kew.*).

Known only from the above collection. The affinity between this species and the next is the closest obtaining between any two species of the genus. Hemsley contrasted *L. sinensis* with "*L. glaucophylla* Hook. fil.," meaning *L. gracilis* (Kurz), with which it has nothing to do. The calyx in the dried state is brown and almost scarious, with a conspicuous tube and very short teeth.

2. ***Leycesteria formosa*** Wallich in Roxb. Fl. Ind. ed. Carey & Wall. ii. 182 (1824); DC. Prodr. iv. 338 (1830); Wall. Pl. As. Rar. ii. 21 (1831); Wight, Illustr. Ind. Bot. ii. 70 ("*Leycesteria*"), 72 ("*Leycesteria*") (1850); Brandis, For. Fl. 256 (1874); Gamble, List Trees, etc. Darjeeling, ed. 1, 46 (1878), ed. 2, 46 (1896), ed. 3, 74 (1929); C. B. Clarke in Hook. fil. Fl. Brit. Ind. iii. 16 (1880); Gamble, Man. Ind. Timb. ed. 1, 217 (1881), ed. 2, 398 (1902), ed. 3, 398 (1922); Fritsch in Engl. u. Prantl, Nat. Pflanzenf. iv. Abt. 4, 169 (1891); Brandis, Ind. Trees, 360 (1906); Rehder in Sargent, Pl. Wils. i. 311 (1912); A.M. & J. M. Cowan, Trees N. Beng. 74 (1929).

Hamelia connata Wallich ms. in sched. in Herb. Wall. sub cat. no. 407, et ex DC., Prodr. iv. 338 (1830), in obs.

Icones. Wallich, Pl. As. Rar. ii. t. 120 (1831) (*Leicesteria*); Bot. Reg. xxv. t. 2 (1839); Bot. Mag. lxx. t. 3699 (1839); Wight, Illustr. Ind. Bot. ii. t. 121 D (1850).

Leycesteria formosa includes within its wide area of distribution the areas of all the other known species of the genus. From the North-West Frontier Province and the Punjab it ranges the whole length of the Himalaya eastwards to south-eastern Yunnan, where it was collected by Henry near Mengtze, and north-eastwards to Szechuan and eastern Tibet, where Rehder's var. *stenosepala* appears to replace very largely the typical form.

It has been considered unnecessary to cite here all the specimens seen: the following is therefore only a representative selection.

INDIA. NORTH-WEST FRONTIER PROVINCE: Shinu Ká Kalthá, Kagán, Hazára, 4 July 1899, *Inayat* in Herb. *Duthie*; Sachán Dara Panjúl, Hazára, 27 Aug. 1899, *Inayat* in Herb. *Duthie*; Malkandi, Kagán, *J. R. Drummond* 20110.

PUNJAB: Chamba State, Bhandal Valley, Chadbaint Reserve, alt. 2400 m., 23 Oct. 1919, *R. N. Parker*; Chamba State, Gharosan Forest, alt. 1800 m., 9 June 1895, *J. H. Lace* 748; Bashahr, Kunawar, 1886, *J. R. Drummond* 22111; Bashahr, Bahli to Taklech, alt. 2100 m., 15 May 1890, *J. H. Lace* 119; Simla, Mashobra, near the Retreat, alt. 2400 m., 14 June 1877, *J. S. Gamble* 4374 a; Simla, Mahásu, alt. 2400 m., 29 Sept. 1877, *J. S. Gamble* 5558 a; Simla, Mahásu, 1885, *Nanak Sobha Ram* in Herb. *J. R. Drummond* 22110; Simla, Mahásu, *H. Collett* 59; Simla and Siwaliks, 1885, *J. R. Drummond* 22647; Sirmore, Govan in Herb. *Wallich*, cat. no. 470 c.

UNITED PROVINCES : Kumaon, *R. Blinkworth* in *Herb. Wallich*, cat. no. 470 (2) ; Garhwal, June 1845, *T. Thomson* 1265 ; Garhwal, Mussoorie, Kidar Kantha, alt. 2700 m., 27 June 1904, *J. R. Drummond* 22786 ; Mussoorie, Park Road, alt. 1950 m., June 1915, *A. Anderson* ; Tihri-Garhwal, Jumnotri, alt. 2700-3000 m., 29 Aug. 1883, *J. F. Duthie* 645 (" vernacular name *Kannel chiro* ") ; Saharanpur, Deoban, Jaunsar, alt. 2700 m., June 1896, *J. S. Gamble* 25806 ; Deota, 15 June 1906, *H. H. Haines* 2263.

NEPAL : Sheopore, Apr. 1821, *Wallich* [cat. no.] 470 (1) ; Domzey, alt. 2400 m., *Lal Dhoj* 17 ; sine loc. exact., *Gower*.

SIKKIM : Choongtam, alt. 2700 m., 23 May 1849, *J. D. Hooker* ; Lachen, alt. 1800-3300 m., 2-4 Aug. 1849, *J. D. Hooker* ; Lachoong, alt. 3000 m., 24 Oct. 1849, *J. D. Hooker* ; Kulhait, alt. 2100 m., 11 Oct. 1870, *C. B. Clarke* 12987 ; Darjeeling, alt. 2100 m., 11 June 1874, *Treutler* [cat. no.] 192 ; Gumpaha, Darjeeling, alt. 2100 m., June 1874, *J. S. Gamble* 3066 a ; Darjeeling, alt. 2100 m., July 1880, *J. S. Gamble* 8264 ; Sinchul, Darjeeling, alt. 2400 m., 13 June 1884, *C. B. Clarke* 35771 a ; Lachung, alt. 2700 m., 6 Sept. 1911, *Ribu & Rhomoo* 5569 ; Tonglo, alt. 2700 m., 1913, *Ribu & Rhomoo* 6302 ; Phallut, alt. 3300 m., 12 Aug. 1913, *Rhomoo* 1174.

KHASIA : Surureem, alt. 1500 m., 26 June 1850, *Hooker & Thomson* 1237.

UPPER BURMA : Hpimaw Hill, alt. 2100 m., general in the lower coppice, 7 June 1919, *R. Farrer* 998.

YUNNAN. Momien (Tengyueh), 22 June 1868, *D. J. Anderson*. Brousse de Ta-hai, alt. 3000 m., Juillet, *Maire* 255/1913 (distr. Edin.) : " Arbuste cassant à tiges creuses ; fl. roses ; fruits bleus." Moist open situations by streams in side valleys on the eastern flank of the Tali range, lat. 25° 40' N., alt. 2100-2700 m., May-Sept. 1906, *Forrest* 4776 : " Shrub of 1½-6 ft. Flowers white, tinged rose on exterior ; bracts deep rose-purple. Fruit black, edible, flavour strongly resembling burnt sugar."

SZECHUAN. Sine loc. exact., July 1903, *Wilson* (Veitch Exped.) 3719 : " 3 ft. ; fls. white."

var. **stenosepala** *Rehder* in *Sargent*, Pl. Wils. i. 312 (1912).

Leycesteria limprichtii *H. Winkler* (apud *Pax, Hoffm. et H. Winkl.*) apud *Limpricht*, Bot. Reise Hochgeb. Chin. Ost-Tib. in *Fedde*, Rep. Spec. Nov. Beih. xii. 493 (1922).

YUNNAN. W. Le long des ruisseaux, Mt. Mao-kou-tchang au dessus de Ta-pin-tze, 23 Apr. 1883, *Delavay* 158. Hay-y près Lou-lan, Jul. 1906, *Paul Nguenou ex Ducloux* 208 (584). Teng-yueh district, *E. B. Howell* 25, 233. Open moist situations on the margins of thickets on the eastern flank of the Lichiang range, lat. 27° 15' N., alt. 3000 m., June 1906, *Forrest* 2503 : " Shrub of 6-10 ft. Flowers whitish, non-fragrant." Moist situations along the base of the Lichiang range, lat. 27° 12' N., alt. 2700 m., June 1910, *Forrest* 5943 : " Shrub of 2-6 ft. Flowers creamy-white, pink on exterior." Sine loc. spec., sed verisimiliter Tsekou, 1907, *Monbeig* 131. *Halliers*

des vallées à Sau-kia, alt. 2550 m., Août, *Maire* 26 (distr. Arn. Arb.) : "Arbuste peu rameux ; tiges vertes, longues, éparses. Fl. blanches sur grappe violette." Broussailles, mont. derrière Siao-ho, alt. 2800 m., Juin, *Maire* 329/1913 (distr. Edin.) ; "Arbuste cassant peu rameux, tout vert ; fl. roses." Halliers, vallée de Kiao-mé-ti, alt. 3100 m., Juin, *Maire* 699/1914 (distr. Edin.) : "Arbuste cassant ; longs rameaux verts ; fl. blanches sur grappe rose." Sine loc., Mai, *Maire* 2429 (distr. Edin.) : "Arbuste ; fleurs d'un blanc rosé." Forest undergrowth, open places, Doker-la, alt. 3000 m., Sept. 1913, *F. K. Ward* 1128 : "Shrub, bushy, 3 ft." Doker-la, on granite soils, shady bush-covered hillsides or open places in the forest, alt. 2100-2400 m., 18 June 1914, *F. K. Ward* 1683 : "Loose bushy shrub, the long shoots flopping over when the plant has attained a height of about 5 ft. ; flowers cream coloured, bracts purple." In montibus inter flumina Salwin et Irrawadi, alt. 2000 m., Oct. 1914, *Schneider* 2590. Kou-ty, circa Pe-yen-tsin, 11 June 1918, *Siméon Ten* 530 : "3 m. ; floribus albo-rubris."

SZECHUAN. Near Tachienlu, alt. 2700-4000 m., *Pratt* 299, 776. Between Tachienlu and Chentu, Oct. 1904, *Hosie*. Sine loc. exact., June 1908, *Wilson* (Arn. Arb. Exp.) 3476, 3478 ; ditto, July 1908, *Wilson* 3477, 3479. In declivitatibus dumosis in regione Huali, alt. 2600 m., 30 Mai 1914, *Schneider* 1394.

TIBET. Kam : vallis fluvii Tung-go-ho, 22 Jul. 1893, *Potani* : "flores albi." Tong-kyuk, in pine forest, alt. 2400-2700 m., 11 Aug. 1924, *F. K. Ward* 6077 : "Shrub of 6-10 ft. ; flowers white."

Distinguished from the typical plant by the elongation of all 5 sepals, which may be up to 7 or 8 mm. in length, and very narrow. In the type there are usually 3 short and 2 long sepals, the latter about 4 or 5 mm. long.

var. **brachysepala** *Airy-Shaw*, var. nov. sepalis brevissimis 1 mm. usque raro vix 2 mm. longis glanduloso-pubescentibus.

YUNNAN, W. Moist situations by streams, on lava bed west of Tengyueh, lat. 25° N., alt. 1500 m., May 1912, *Forrest* 7647 : "Shrub of 3-6 ft. Flowers yellowish-white interior, exterior flushed lake. Fruit black."

YUNNAN, S.E. South of Red River from Manmei, alt. 1800 m., *Henry* 9692 ; Mengtze, mountains to north, alt. 1650 m., *Henry* 9692 a ; ibid., alt. 1800 m., *Henry* 9692 b : "Shrub, 6 ft. ; white flowers."

Possibly not worthy of varietal recognition, but the sepals are unusually short, not longer than those of *L. sinensis*.

var. **glandulosissima** *Airy-Shaw*, var. nov. omnibus partibus hornotinis densissime pubescentibus atque glanduloso-pilosis.

Ramuli hornotini brevissimi. *Flores* praecociores.

YUNNAN. Distr. Yunnan-fu, in collibus bor.-occ., solo sabuloso, 9 Mai. 1916, *O. Schoch* 43.

No other specimen has been seen in which the indumentum is so markedly developed. The previous year's branches are long, straight, sparingly branched and quite glabrous.

3. **Leycesteria crocothyrsos** *Airy-Shaw*, sp. nov. ab omnibus congeneris corolla aurantiaca basi valde 5-saccata distinctissima; a *L. formosa* Wall., cui quam ceteris forsan propior, stipulis magnis, stylo pubescente statim distinguenda; inter species stipulatas, a *L. glaucophylla* (Hook. fil. et Thoms.) Hook. fil. pseudo-verticillis 6-floris, et a *L. stipulata* (Hook. fil. et Thoms.) Fritsch foliis subtus haud lanuginosis, stylo pubescente diversa.

Frutex parvus, lusus, statura ignota. *Rami* *annotini* ignoti. *Rami hornotini* fistulosi, teretes, usque 4 dm. longi (inflorescentia terminali inclusa), circiter 4 mm. diametro, sparse breviter glanduloso-pilosi vel glabrescentes, basi perulis scariosis late triangularibus usque lanceolatis 3–10 mm. longis raro apice foliaceis circiter 2 cm. longis cincti; internodia circiter 8 cm. longa. *Folia* iis *L. formosae* similia, ovata usque oblonga raro fere ovato-lanceolata, basi rotundata vel vix angustata, apice acuminata conspicue caudata, usque 12.5 cm. longa (cauda circiter 2 cm. longa inclusa), 5 cm. lata, margine (basi caudaque exceptis) leviter et subremote dentata dentibus glanduloso-apiculatis, sparse ciliata, pagina superiore olivacea pilis persparsis circiter 1 mm. longis praedita, costa densiuscule breviter pubescente, nervis glabris, pagina inferiore glaucescente, tota minutissime pubescente (costa manifestius), nervis utrinque circiter sex; petioli brevissimi, 3–5 mm. longi, plerumque anguste alati, pubescentes praecipue supra pilis plus minus aureis. *Stipulae* interpetiolares magnae, latissime reniformes vel suborbiculares, usque 2 cm. latae et 1 cm. longae, basi utrinque petiolis foliorum breviter adnatae, margine integrae vel indistincte crenulatae, supra olivaceae, subtus glaucescentes. *Inflorescentia* terminalis, elongata, plus minus pendula, usque 12.5 cm. longa, rhachide dense glanduloso-villoso-pubescente. *Flores* sessiles in pseudo-verticillis 6-floris (cymulis binis trifloris) dispositi; pseudo-verticilli circiter 7, omnes bracteis binis late ovatis acuminatis vel acutis integris basi subcordatis vel angustatis usque 2 cm. longis et 1 cm. latis tenuiter membranaceis glabrescentibus dilute purpurascentibus margine dense glanduloso-ciliatis suffulti, bracteolis in quoque verticillo 4 bracteis similibus sed subduplo minoribus. *Receptaculum* ovoideum, apice subattenuatum, densissime glanduloso-villoso-hispidum, circiter 5 mm. longum, 3 mm. diametro. *Calycis segmenta* breviter connata, maiuscula, aequalia, ovato-oblonga, subacuta, circiter 5 mm. longa et 3 mm. lata, herbacea, margine glanduloso-ciliata, extra sparse breviter pilosa, intus glabra. *Corolla* actinomorpha, laete aurantiaca (teste lectore), alabastro late clavata circiter 1.5 cm. longa; tubus sub anthesi late infundibuliformis, circiter 1.5 cm. longus, fauce 1.5 cm. diametro, basi truncato-intrusa in sacculos nectariferos 5 sepalis alternantes conspicue gibboso-ampliatas, 4–5 mm. latus, extra dense glanduloso-pilosus, intus ad staminum filamenta et ad

nervos 5 praecipuos glanduloso-pilosus ceterum glaber; lobi imbricati, patentes, ovato-triangulares, obtusi vel rotundati, circiter 5 mm. longi et lati, extra plus minus glanduloso-pilosi, intus glabri. *Staminum filamenta* corollae tubo usque ad basin adnata, circiter 1.3-1.4 cm. longa, dense barbata, parte sexta suprema libera, ipso apice ovoideo-tumida, dein acuta; antherae oblongae, utrinque obtusae, 3-4 mm. longae, 1-1.5 mm. latae. *Stylus* in alabastro circiter 1 cm. sub anthesi usque 1.7 cm. longus, satis validus, parte tertia suprema glabra, ceterum dense pubescens; stigma magnum, capitatum, lobatum, circiter 3 mm. diametro. *Ovarium* quinqueloculare, multiovulatum. *Fructus* non visi.

Icones. Hooker, *Icones Plantarum*, ser. 5, ii. t. 3165 (1932).

ASSAM. Delei valley, 28° 20' N., 96° 37' E., alt. 1800 m., growing on the steep sheltered gneiss face, in dense thickets, 8 May 1928, *F. K. Ward 8180*. "A small lax shrub. Flowers bright orange."

The genus *Leycesteria* is nothing if not heterogeneous. That a species should be discovered with bright yellow flowers could hardly have been anticipated from a knowledge of those previously described. The no-man's land of north-east Upper Burma, where India, China and Tibet meet, has yielded yet another of its strange botanical treasures, and this is surely not the least beautiful of them. Capt. F. K. Ward informs the writer that the seeds of this species, which he brought home, have germinated "like mustard and cress," yet Capt. Ward saw but one solitary plant in its native habitat.

It would seem, therefore, to be a species of extremely restricted distribution, but it is difficult to suggest whether it is more probably a "young" or a "relict" species. On account of its stem-structure and inflorescence a comparison can be instituted only with *L. formosa*, but a close affinity can scarcely be inferred therefrom.

The chief points of interest, from a morphological point of view, are the following: the stipules, the form and colour of the corolla, and the hairy style. Stipules occur also in *L. stipulata* and *L. glaucophylla*, and the latter has a hairy style. But the great development of the basal nectariferous saccae is unique, and the striking colouring of the corolla—lemon-yellow for the tube, orange-yellow for the limb—is no less so.

The occurrence of stipules in a third species of *Leycesteria* adds still greater weight to Sommier's remarks on the taxonomic value of these organs (in *Nuov. Giorn. Bot. Ital.* xxii. 217-227: 1890).

4. *Leycesteria stipulata* (*Hook. fil. et Thoms.*) *Fritsch* in *Engl. u. Prantl, Nat. Pflanzenf.* iv. Abt. 4, 169 (1891); A. M. & J. M. Cowan, *Trees N. Beng.* 74 (1929).

Loniceria stipulata Hook. fil. et Thoms. in *Journ. Linn. Soc.* ii. 165 (1858); [? Lindley] in *Gard. Chron. & Agric. Gaz.* [xviii.] 700 (1858).

Pentaptyxis sp., Hook. fil. in *Benth. & Hook. Gen. Plant.* ii. 6 (1873).

Pentaptyxis stipulata (Hook. fil. et Thoms.) Hook. fil. ex C. B. Clarke in Hook. fil. Fl. Brit. Ind. iii. 17 (1880); Gamble, List Trees, etc. Darj. ed. 1, 45 (1878); ed. 2, 46 (1896); Gamble, Man. Ind. Timb. ed. 1, 217 (1881); ed. 2, 399 (1902); ed. 3, 399 (1922); Sommier in Nuov. Giorn. Bot. Ital. xxii. 217-227 (1890), *passim*.

Icones. Gard. Chron. & Agric. Gaz. [xviii.] 700, fig. 1 (1858); Nuov. Giorn. Bot. Ital. xxii. t. 2, fig. C (1890).

SIKKIM. Without precise locality, alt. 1800-3000 m., 29 March, *J. D. Hooker* 5: "Flowers all white." Rungbee, alt. 1800 m., 13 June 1870, *C. B. Clarke* 11976 *a*: "Shrub with complanate pendent branches." Darjeeling, alt. 2100 m., 25 Feb. 1871, *C. B. Clarke* 13869 *a*: *ibid.*, 24 June 1875, *C. B. Clarke* 26746 *a*: *ibid.*, 10 Apr. 1876, *C. B. Clarke* 27488 *d*; *ibid.*, alt. 2250 m., 31 May 1884, *C. B. Clarke* 34992 *b*; *ibid.*, alt. 2100 m., June 1875, *Gamble* 3064 *a*; *ibid.*, alt. 2100 m., 22 June 1876, *Gamble* 733 *a*; *ibid.*, on the 'Calcutta' road, alt. 2250 m., 11 Apr. 1913, *C. C. Lacaita*: "Flowers white, with very faint blush." Darjeeling to Jorbungalow, alt. 2100 m., *J. H. Lace*.

Believed, until quite recently, to be confined to Sikkim, where, however, it is said to be locally extremely abundant. Capt. F. K. Ward, writing in May 1931, from North-East Upper Burma, reports the occurrence in quantity of what he takes to be this species in the Adung Valley, lat. 28° 10' N., 97° 40' E. If this is verified, it will be an interesting extension of its range. Every part of the plant, except the inside of the corolla, is densely woolly.

5. *Leycesteria glaucophylla* (Hook. fil. et Thoms.) Hook. fil. ex C. B. Clarke in Hook. fil. Fl. Brit. Ind. iii. 16 (1880), *excl. diagn.*, et ref. "*Gard. Chron.*" pro parte, et *synon.* "*Lonicera gracilis* Kurz," et loc. "*Simonbong, Kurz*" et *verbis descriptionis* "A much more slender plant . . . ovate-subulate" et "entirely absent or" (p. 17, l. 1); Sommier in Nuov. Giorn. Bot. Ital. xxii. 217-227 (1890), *passim*, *pro maxima parte*.

Lonicera glaucophylla Hook. fil. et Thoms. Praec. Fl. Ind. in Journ. Linn. Soc. ii. 165 (1858); [? Lindley] in Gard. Chron. & Agric. Gaz. [xviii.] 700, *partim* (1858); Rehder in Rep. Miss. Bot. Gard. xiv. 216 (1903).

Pentaptyxis sp. Hook. fil. in Benth. & Hook. Gen. Plant. ii. 6 (1873).

Lonicera gracilis Rehder in Rep. Miss. Bot. Gard. xiv. 216 (1903), *non Kurz*.

Leycesteria Belliana W. W. Smith in Trans. Proc. Bot. Soc. Edinb. xxiv. pp. xliii et 173 (1911), et in Rec. Bot. Surv. Ind. iv. 379 (1913); Calder, Narayanaswami et Ramaswami in Rec. Bot. Surv. Ind. xi. 81 (1926); A.M. & J. M. Cowan, Trees N. Beng. 74 (1929).

Icones. Gard. Chron. & Agric. Gaz. [xviii.] 700, fig. 2 dextr., *non sinistr.* (1858); Trans. Proc. Bot. Soc. Edinb. xxiv. t. xiii. (1911).

SIKKIM. Singalelah, alt. 1500-1800 m., 14 Dec. 1848, *J. D. Hooker* 6; Yoksun, alt. 1500-1800 m., 12 Jan. 1849, *J. D. Hooker* 6; Karponang, alt. 2850 m., 4 July 1910, *W. W. Smith* 2996. "East Himalaya," *Ribu & Rhomoo, sine num.*

Apparently confined, like the last species, to Sikkim, but, unlike it, evidently rather uncommon, and reaching somewhat higher altitudes.

The specimen from Tonglo (*Anderson* 154) cited by Smith (1911, *l.c.* p. 174) has not been seen by the writer. The leaves are described as "subtus . . . praecipue in venis \pm rufescenti-strigillosa." There is no sign of "rufescence" in the specimens of Hooker, Smith or Ribu & Rhomoo. The peculiarity of the indumentum, which appears to have been overlooked, is that each hair of the smaller veins and intervening tissue appears under a low power to arise from a bulbous base or small pustule. Higher magnification shows that this consists of about 4-6 minute oblong or subglobular masses of wax closely surrounding the base of the hair and frequently coalescing with each other. They appear to be definite extrusions from the leaf, and not prominences of the cuticle. A similar phenomenon, to a less degree, can be observed in the case of *L. stipulata*, though, owing to the extreme density of the indumentum in that species, the base of the hairs is not easily exposed without damaging the waxy secretion.

The occurrence of this character in these two species, together with the irregular, non-addressed arrangement of the indumentum, and the possession of stipules, appears to indicate some degree of affinity between them. They were originally described together under *Lonicera* and later associated to form the new genus *Pentapyxis* (Benth. et Hook. Gen. Pl. ii. 6: 1873), solely because they both possessed stipules.

The confusion in which this species and the next have been involved is due, in the first instance, to Hooker and Thomson having described their *Lonicera glaucophylla* without flowers or fruit, and then to Hooker's identification of Thomson's flowering material of *L. gracilis* (at that time undescribed) with his own sterile material of *L. glaucophylla*. The fact that both gatherings came from Yoksun was apparently considered sufficient ground for regarding them as conspecific, in spite of the fact that Hooker's specimens possessed stipules and a very peculiar indumentum on the undersurface of the leaves, while Thomson's were exstipulate and the extremely sparse indumentum was in no way remarkable.

The result was that Hooker's original specimens of *L. glaucophylla* were gradually lost sight of, their sterility no doubt helping towards this, and Thomson's material was taken as the most representative of *L. glaucophylla* for purposes of identification. Subsequent collectors brought in further material which undoubtedly matched that of Thomson: it was therefore practically inevitable that, when Kurz described some of this material as *Lonicera gracilis*, it should

almost immediately be reduced to *L. glaucophylla*. Even Kurz's remark, that his species differed "in every respect" from Hooker and Thomson's, failed to stimulate further investigation by critical botanists. The references made by Sommier (*l.c.*) to "*Lonicera glaucophylla*" and "*Leycesteria glaucophylla*" show that he, too, shared the common belief that stipules might or might not be present in this species, or rather mixture of species.

Another contributory cause to the persistence of this error was the fact that the true *L. glaucophylla* was apparently not collected again until 1910, when Prof. W. Wright Smith obtained the first known flowering material. He described it in 1911 as a new species, *L. Belliana*, and stated, on the strength of a comparison of material at Kew made by Prof. W. G. Craib, that this was a "species *Leycesteria sinensis* Hems. valde affinis," but, in view of the considerable list of differences enumerated almost immediately afterwards, and the further distinction, not mentioned in the list, that the flowers of *L. glaucophylla* are in pairs, not sixes, the reason for this statement is not quite clear.

6. *Leycesteria gracilis* (Kurz) Airy-Shaw, comb. nov.

Lonicera (*Leycesteria* [sic]) *gracilis* Kurz in Journ. As. Soc. Beng. xxxix. 2. 77 (1870); Gamble, List Trees, etc. Darj. ed. 1, 46 (1878); Rehder in Rep. Miss. Bot. Gard. xiv. 216 (1903), pro syn. *Leycesteriae glaucophyllae*.

Lonicera glaucophylla [? Lindley] in Gard. Chron. & Agric. Gaz. [xviii.] 700, *partim* (1858); *non* Hook. fil. et Thoms.

Leycesteria glaucophylla Hook. fil. ex C. B. Clarke in Hook. fil. Fl. Brit. Ind. iii. 16 (1880), *excl. synonym.* "*Lonicera glaucophylla* Hook. fil. et Thoms." et "*Pentaptyxis* sp.," et loc. "Yoksun, J.D.H.," et verbis descriptionis "or more or less developed . . . presence of stipules" (p. 17, lines 1-4); Gamble, List Trees, etc. Darj. ed. 2, 46 (1896); Hemsl. in Hook. Ic. Plant. xxvii. sub t. 2633, in obs. (1900); Gamble, Man. Ind. Timb. ed. 2, 398 (1902); ed. 3, 398 (1922); W. W. Smith in Rec. Bot. Surv. Ind. iv. 379 (1913); A. M. & J. M. Cowan, Trees Northern Bengal 74 (Gamble, List, ed. 3) (1929); *non* *Lonicera glaucophylla* Hook. fil. et Thoms.

Pentaptyxis glaucophylla Hook. fil. ex Gamble, Man. Ind. Timb. ed. 1, 217 (1881), in obs., *non* *Lonicera glaucophylla* Hook. fil. et Thoms.

Icones. Gard. Chron. & Agric. Gaz. [xviii.] 700, fig. 2 *sinistr.*, *non dextr.* (1858); Hooker, *Icones Plantarum*, ser. 5, ii. t. 3166 (1932).

SIKKIM. Yoksun, [alt. circiter 1500 m.], 1857, T. Thomson. Simonbong, [Anderson in] *Herb. S. Kurz* (type !). Labah, Dumsong, alt. 1800 m., March 1875, Gamble 3073 a: "Very pretty small shrub; fruits 639 blue!" Chota Rimitti, Darjeeling, alt. 2100 m., Nov. 1879, Gamble 7451. Pankasári Ridge, alt. 2250 m., 12 Oct. 1902, J. H. Lace 2401. Labah Ridge, alt. 2100 m., Dec. 1904, H. H. Haines

BB 2002. Above Rhikisum, alt. 2250 m., 25 Apr. 1913, C. C. Lacaita: "Berry oval, purple, tipped with green calyx."

BHUTAN. Sine loc. spec., Booth in Herb. Nuttall.

BURMA. Bhamo Div.: Bumrawng, alt. 1650 m., March 1909, G. E. S. Cubitt 387.—Vernacular name (Kachin): "*Nhkra-la* (?)."

WESTERN YUNNAN. Moist, shady situations amongst scrub, Ku-Tan-Ho Valley, Salwin valley, Salwin-Irrawadi divide, lat. 25° 55' N. alt. 1800-2100 m., Nov. 1905, *Forrest 1063*: "Spreading semi-trailing shrub of 6 to 10 ft. Flowers yellowish-white." On hills to west of Tengyueh, amongst scrub, lat. 25° N., alt. 1800 m., June 1912, *Forrest 8261*: "Shrub of 3-6 ft., in fruit." Open situations in thickets on western flank of Shweli-Salwin divide, lat. 25° 20' N., alt. 2100-2400 m., Nov. 1912, *Forrest 9377*: "Shrub of 3-9 ft. Flowers white." Open scrub in rocky situations, hills to the north of Tengyueh, lat. 25° 20' N., alt. 1800 m., March 1913, *Forrest 9723*: "Shrub of 3-5 ft. Flowers white, fragrant." Amongst scrub by streams on the Shweli-Salwin divide, lat. 25° 10' N., alt. 2400 m., July 1918, *Forrest 17527*: "Shrub of 4-7 ft. Flowers white, flushed rose exterior." Open situations by streams on the Shweli-Salwin divide, lat. 25° 45' N., long. 98° 50' E., alt. 2400 m., Nov. 1924, *Forrest 26032*: "Shrub of 6-9 ft. Branches arched almost from base. Flowers white."

SOUTH-EASTERN YUNNAN. South of Red River from Manmei, alt. 1800 m., *Henry 9767*: "Shrub, 10 ft.; white flowers."

It is this species, and not the preceding, which is meant whenever "*Leycesteria glaucophylla*" is mentioned in the literature of the genus, the true *glaucophylla* being referred to (since 1911) as *L. Belliana* W. W. Sm. Enough has, it is hoped, been said under that species to make the position clear. Fritsch's cryptic remark (in Engl. u. Prantl, Nat. Pflanzenf., l.c.) that "*L. glaucophylla* Hook. f., ausgezeichnet durch 7-8 Carpelle, nähert sich der 2. Section," i.e. Sect. *Pentaptyxis* (Hook. fil.) Fritsch, with 1 species, *L. stipulata*, is explained when it is remembered that "*L. glaucophylla*" has always been regarded as the correct name for what is really *L. gracilis*, but which, it was thought, occasionally developed stipules on the young barren branches. Fritsch had not disentangled these two species; hence his opinion, that the composite plant "*L. glaucophylla*" with its 7-8 carpels approached *L. stipulata*, contained a germ of truth.

Reference has already been made (p. 164) to the resemblance between the inflorescence of the present plant and that of *Symphoricarpos sinensis* Rehd. The existence of a member of the latter, otherwise exclusively American, genus so far from its "home" as Western Hupeh, Central China, is as unexpected as it is interesting. Taken in conjunction with the fact that a peculiarly "Symphoricarpoid" *Leycesteria* stretches out in this direction as far as Yunnan, it becomes tempting to regard the circumstance as "suggestive." But suggestive of what? The inflorescence of *Symphoricarpos sinensis* is more elongate than that of most of its congeners, though

less so than in *Leycesteria gracilis*, but the latter's very small bracts and bracteoles, subtending the paired flowers, and the two decussate pairs of small bud-scales at the base of the inflorescence, are almost exactly those of the Chinese *Symphoricarpos*. These anomalous characters, and the usually 8-locular ovary, which is unique not only in the genus but in the whole family *Caprifoliaceae*, seem to justify the establishment of the new subgenus here proposed for *Leycesteria gracilis*. As to whether there is, or ever has been, any connection between these two otherwise tribally distinct genera, nothing can be said, apart from pure speculation, until, and unless, the discovery of further species sheds further light on the question.

XXII.—CONTRIBUTIONS TOWARDS A FLORA OF BRITISH NORTH BORNEO : I. C. E. C. FISCHER.

Collections of herbarium specimens from British North Borneo have been received recently from Mr. H. G. Keith of the Forestry Department in that territory. The first sending has proved of such interest, containing as it does four new species and a number of plants new to the area, that it has been deemed advisable to assemble the records in a series under the above title. The notes will be confined strictly to British North Borneo.

As a starting point Merrill's enumeration of the plants of Borneo, published in the Journal of the Royal Asiatic Society, Straits Branch, in September, 1921, has been adopted, and any specimens of species which are not definitely attributed therein to British North Borneo will be cited.

Tetracera Boerlagei Merr. [Dilleniaceae].

Lokan, Kinabatangan, fr. June, *Arsat* in Herb. For. Dept. 1277. "Woody vine; fr. green. Orang Sungei name: *Pampan*"; Batu Puteh, fl. June, *Arsat* in Herb. For. Dept. 1279. "Fl. white. Orang Sungei name: *Karis-karis*."

Crataeva religiosa Forst. [Capparidaceae].

Tanjong Pang, fl. Feb., *Arsat* in Herb. For. Dept. 1206. "Tree 20 ft. high, 4 in. diam., in forest; fl. yellow."

Flacourtia rukam Zoll. et Mor. [Flacourtiaceae].

Tanjong Bulet, fl. Nov., *Arsat* in Herb. For. Dept. 1295. "Tree 25 ft. high, 10 in. diam.; fl. yellow"; Batu Puteh, fl. Jan., *Arsat* in Herb. For. Dept. 1338.

Xanthophyllum Arsatii C. E. C. Fischer, sp. nov. [Polygalaceae]; *X. ancolano* Miq. similis sed foliis petiolis paniculisque multo longioribus, foliorum nervis lateralibus numerosioribus.

A small tree; branchlets greyish-brown, glabrous, twigs sulcate, fuscous-felted. Leaves chartaceous, elliptic, narrowed acutely at both ends, 14–27 cm. long, 3.5–7 cm. wide, midrib prominent below, lateral nerves 9–10 pairs, raised below, arching and uniting 3–5 mm. within the entire, slightly undulate margin, glabrous except for the

midrib which is minutely fuscous-puberulous especially near the base, eglandular ; petioles 1.2-2.2 cm. long, narrowly channelled above, fuscous-felted, the basal two-thirds rugulose. *Panicles* axillary and terminal, up to 1 dm. long ; rhachis and branches sulcate and reddish when dry, fuscous-puberulous ; bracts minute ; flowers numerous ; pedicels 2 mm. long, slightly enlarged to the apex, fuscous-felted. *Sepals* broadly ovate to subcircular, obtuse, thick, unequal, 2.5-4 mm. long, densely fuscous-puberulous on both sides except for the nearly glabrous marginal strip, reddish, minutely ciliate. *Petals* 5, red, 4 of them subequal, oblong-lanceolate, obtuse, base rounded with a short broad claw, 1 cm. long, 0.3 cm. wide, slightly plicate, glabrous, the fifth deeply boat-shaped, obtuse, base truncate and abruptly cuneate to the short broad claw, 0.87 cm. long, 0.65 cm. wide, puberulous without. *Stamens* 8, 8 mm. long ; filaments free, curved, subulate, glabrous except for a patch of greyish pubescence inside about 2 mm. above the widened, flattish base ; anthers narrowly oblong, 1 mm. long, united round the stigma, sparsely bearded at the base. *Ovary* shortly, stoutly stipitate, subglobose, 1.25 mm. long, densely fuscous-hairy, 1-celled ; ovules 3 ; style flattened, curved, 5 mm. long, sparsely set with spreading hairs, reddish ; stigma entire. *Fruit* not seen.

Lukan, fl. March, *Arsat* in Herb. For. Dept. 1213 (type). "Tree 25 ft. high, 5 in. diam. ; fl. red" ; Sarawak River, *G. D. Haviland*.

Dipterocarpus oblongifolius *Bl.* [Dipterocarpaceae].

Lunut, fr. Aug., *Arsat* in Herb. For. Dept. 1252. "Tree 70 ft. high, 15 in. diam. ; fr. red. Orang Sungei name : *Kasooy*."

Shorea Gysbertiana *Burck* [Dipterocarpaceae].

Maraba, near sea-level, fr. June, *Md. Tahir* in Herb. For. Dept. 1289. "Tree 40 ft. high ; fr. green, yielding an edible oil. Malay name : *Kawang*."

Shorea leprosula *Miq.* [Dipterocarpaceae].

Lunut, fr. Aug., *Arsat* in Herb. For. Dept. 1254. "Tree 50 ft. high, 12 in. diam. ; fr. green. Orang Sungei name : *Matu*."

Pterospermum diversifolium *Bl.* [Sterculiaceae].

Kujak, fl. April, *Arsat* in Herb. For. Dept. 1329. "Fl. red" ; Loka, fl. June, *Arsat* in Herb. For. Dept. 1282. "Tree 50 ft. high, 10 in. diam. ; fl. white. Orang Sungei name : *Litak*."

Pterospermum elongatum *Korth.* [Sterculiaceae].

Batu Puteh, fl. May, *Arsat* in Herb. For. Dept. 1262. "Tree 50 ft. high, 9 in. diam. ; fl. white. Malay name : *Bayur*."

Commersonia platyphylla *Andr.* [Sterculiaceae].

Pin River, fl. Sept., *Arsat* in Herb. For. Dept. 1242. "Tree 20 ft. high, 7 in. diam. ; fl. white. Orang Sungei name : *Meng-kepen*" ; Kamangian, fl. June, *T. Goklin* in Herb. For. Dept. 1303. "Fl. yellow. Orang Bisaya name : *Hagis-hagis*."

Columbia serratifolia DC. [Tiliaceae].

Batu Puteh, fl. March, *Arsat* in Herb. For. Dept. 1212; fr. June, *Arsat* in Herb. For. Dept. 1270. "Tree 50 ft. high, 8 in. diam.; fl. white. Orang Sungei names: *Mang Kopan*, *Anggurong*."

Elaeocarpus Griffithii Mast. [Elaeocarpaceae].

Meraba, Weston, fl. Oct., *Md. Tahir* in Herb. For. Dept. 1228. "Tree 20 ft. high, 6 in. diam.; fl. white. Malay name: *Suagam*."

Aglaia lancifolia Harms [Meliaceae].

Ulu Bakan River, fl. July, *Bayak* in Herb. For. Dept. 1236. "Shrub 10 ft. high."

Lophopyxis pentaptera Engl. [Olacaceae].

Tanjong Bulet, fr. Nov., *Arsat* in Herb. For. Dept. 1294.

Zizyphus celtidifolia DC. [Rhamnaceae].

Boras Mainto, fl. April, *Arsat* in Herb. For. Dept. 1327. "Fl. yellow."

Nephelium malaiense Griff. [Sapindaceae].

Linkengen, 30 ft., young fr. June, *Md. Tahir* in Herb. For. Dept. 1288. "Tree 15 ft. high, 6 in. diam.; young fr. green. Malay name: *Mata Kuching*."

Otophora edulis C. E. C. Fischer, sp. nov. [Sapindaceae]; *O. amplifoliae* Pierre similis, sed foliolis numerosioribus linearibus sessilibus, fructuque majore.

A small tree, with angled, glabrous twigs. *Leaves* membranous, glabrous, crowded at the ends of the twigs, sessile, paripinnate; rhachis 20–30 cm. long, acutely quadrangular, the lateral edges with reticulately veined wings 2–3 mm. wide throughout, very shortly produced beyond the terminal leaflets, the wings narrowed at the insertion of the leaflets, base widened and subamplexicaul. *Leaflets* 9–10 pairs, including the basal stipuliform pair which are broadly ovate or subcircular, acute, 0.8–1 cm. long, the next pair 5–8 cm. distant with intervals of about 2.5 cm. between all the rest, opposite or alternate, sessile with a broad rugulose attachment to the rhachis, linear, tapering to a blunt apex, abruptly narrowed to a rounded, inequilateral base, 8–16 cm. long, 1.5–2 cm. wide, midrib sharply prominent on both sides, primary lateral nerves about 22, hardly more distinct than the secondary, ultimate reticulations fine. *Inflorescence* a much-branched open panicle, up to 40 cm. long; rhachis brown, minutely puberulous, the branches angled and densely fuscous-puberulous towards the extremities; flowers fascicled; bracts minute, narrowly lanceolate, deciduous; pedicels slender, 6–8 mm. long, puberulous. *Sepals* 5, subcoriaceous, obtuse, the 2 outer ovate to rotund, the 3 inner broadly oblong with sub-hyaline margins, 3–5.5 mm. long, the outermost smallest, increasing in size inwards, glabrous or sparsely puberulous at the base. *Petals* 6–7, orbicular, margins erose, infolded at the base and

simulating scales, 2.6-3.4 mm. long, slightly pubescent outside at the base and up to the centre. *Disc* fleshy, annular, short, mouth 8-9-crenate. *Stamens* 8-9, inserted on the edge of the disc; filaments flat, 0.7 mm. long, white-hairy in the upper half; anthers oblong, 1 mm. long. *Ovary* depressed-globose, sulcate opposite the anthers, 1.8 mm. long, glabrous, 3-celled; style short, stout; stigma peltate, 2.5 mm. diam., faintly 3-lobed, glabrous. *Fruit* subglobose to obovoid, 3.5 cm. long, brown when dry; stalk stout, woody. *Seed* fleshy, oblong, 2.5 cm. long, 1.3 cm. diam., basal areola large, slightly oblique.

Banks of the Segama River, 310 ft., fl. and fr. Jan., *P. Orolfo* in Herb. For. Dept. 1319. "Tree 20 ft. high and 3 in. diam.; fl. reddish: seeds eaten by the local people."

Mischocarpus fuscescens Bl. [Sapindaceae].

Bundu, fl. June, *T. Goklin* in Herb. For. Dept. 1305. "Fl. yellow."

Mischocarpus sumatranus Bl. [Sapindaceae].

Kinabatangan, fr. March, *B. Evangelista* in Herb. For. Dept. 1235. "Tree 30 ft. high, 6 in. diam., in forest."

Spatholobus ferrugineus Benth. [Papilionaceae].

Nunuya, fl. May, *Md. Tahir* in Herb. For. Dept. 1300. "Fl. red."

Dalbergia parviflora Roxb. [Papilionaceae].

Pin River, fr. Sept., *Arsat* in Herb. For. Dept. 1243. "Fr. green. Orang Sungei name: *Lake*"; Tanjong Bulat, *Arsat* in Herb. For. Dept. 1299. "Orang Sungei name: *Dorilak*."

Crudia bantamensis Koord. et Val. [Caesalpiniaceae].

Pin River, young fr. Sept., *Arsat* in Herb. For. Dept. 1244. "Tree 50 ft. high, 13 in. diam.; fr. red. Orang Sungei name: *Papereng*."

Saraca lanceolata Merr. [Caesalpiniaceae].

Lunut, fl. Aug., *Arsat* in Herb. For. Dept. 1251. "Tree 50 ft. high, 10 in. diam.; fl. yellow. Orang Sungei name: *Pamparang*"; Lukan, fr. March, *Arsat* in Herb. For. Dept. 1202. "In high forest; fr. green. Orang Sungei name: *Bulanut*."

The legume is narrowly oblong, flat, attenuate at both ends, apex mucronate, glabrous, 15.5-19 cm. long, 3.5-6.5 cm. wide, the dorsal margin undulate.

Terminalia laurinoides Teijsm. et Binn. [Combretaceae].

Lukan, fl. March, *Arsat* in Herb. For. Dept. 1205. "Tree 50 ft. high, 9 in. diam.; fl. white. Orang Sungei name: *Dam-pirut*."

Leptospermum amboinense Bl. [Myrtaceae].

Sandakan, near the catchment area, 600 ft., fl. Sept., *G. Pascual* in Herb. For. Dept. 1218. "Fl. white. Orang Murut name: *Kandis-kandis*."

Eugenia Foxworthyana Ridl. [Myrtaceae].

Pin River, fl. March, *Arsat* in Herb. For. Dept. 1346. "Tree 20 ft. high, in forest; fl. white. Orang Sungei name: *Paumpung*."

Melastoma malabathricum Linn. [Melastomaceae].

Batu Puteh, fl. May, *Arsat* in Herb. For. Dept. 1261. "Shrub 10 ft. high. Orang Sungei name: *Gasing*."

Homalium caryophyllaceum Bl. [Samydaceae].

Batu Puteh, fl. Feb., *Arsat* in Herb. For. Dept. 1345. "Tree 50 ft. high, 20 in. diam., in forest. Malay name: *Kamuring*."

Timonius mutabilis Walp. [Rubiaceae].

Membakut, fl. July, *Md. Tahir* in Herb. For. Dept. 1221. "Shrub 8 ft. high; fl. golden-yellow. Brunei name: *Rantap*."

Ixora grandiflora Zoll. et Mor. [Rubiaceae].

Batu Puteh, fl. Feb., *Arsat* in Herb. For. Dept. 1340. "Tree 25 ft. high, 12 in. diam.; fl. yellow. Orang Sungei name: *Manpur*."

Randia Keithii C. E. C. Fischer, sp. nov. [Rubiaceae]; *R. urantherae* C. E. C. Fischer proxima, sed foliis multo minoribus nervorum axillis foveolatis, stipulis multo latioribus quam longioribus, floribus pedunculatis, staminibus numerosioribus haud caudatis.

A small tree, glabrous except the inflorescence, twigs terete, hollow, dark-olivaceous when dry, minutely verruculose. Leaves when dry rigidly chartaceous, dark-olivaceous above, paler below, narrowly elliptic to ovate-elliptic, often subfalcate, acute at both ends, 5.5-9 cm. long, 1.5-3 cm. wide, lateral nerves 4-6 pairs, distant, arching and uniting near the slightly revolute margins, slightly impressed above, sometimes obscure, the axils pitted; petioles 2 mm. long, rugulose; stipules 2-3 mm. long, very much wider, abruptly acute. Flowers sessile, axillary, solitary or in pairs, on a stout peduncle 2 mm. long; bracts broadly ovate, acute, usually keeled, semi-amplexicaul, 2.5-3.5 mm. long, fulvous-ciliate; bracteoles similar, 1.5-2.5 mm. long. Calyx narrowly turbinate, 8 mm. long, lobes 5, sometimes with 1-2 smaller ones interposed, triangular, acute or subacute, 1 mm. long, fulvous-ciliate, produced 4 mm. above the ovary, clothed within with appressed, fulvous, ascending hairs. Corolla-tube slender, 5.5-6 cm. long, 2.6 and 7 mm. diam. at base and apex respectively; segments 6-7, oblong, rounded, 3.3 cm. long, 1.6 cm. wide. Stamens 8, included; filaments very slender, 1.5 mm. long, inserted about 1.2 cm. below the mouth of the corolla-tube; anthers narrowly linear, 8 mm. long, versatile, bearing very few setae at the apex, connective produced into a short mucro. Ovary 2-celled, crown shortly produced into the calyx-tube; ovule solitary in each cell; style slender, 2 cm. long, glabrous; stigma narrowly clavate, 3 mm. long. Fruit unknown.

Forest Reserve Sandakan, 500 ft., Feb., *H. G. Keith* in Herb. For. Dept. 1215. "Tree 25 ft. high, 3 in. diam.; fl. white. Second growth forest."

Petunga pentamera C. E. C. Fischer, sp. nov. [Rubiaceae]; *P. gracili* Korth. valde affinis, sed foliis angustioribus, racemis longioribus, bracteolis minoribus, pedicellis longioribus, floribus pentameris.

A tree, glabrous except the inflorescence; twigs dark-brown when dry, the two or three distal internodes sulcate and slightly flattened below the node, 6–10 cm. long. *Leaves* distichous, chartaceous and brown when dry, paler below, elliptic, acute or shortly acuminate, base acute, inequilateral, 10–17 cm. long, 2.7–5.5 cm. wide, midrib prominent below, lateral nerves 9–11 pairs, ascending, curved and uniting near the margins; petioles narrowly channelled above, 1–1.5 cm. long; stipules ensiform from a wide base, acuminate, 0.8–1.4 cm. long. *Racemes* axillary, slender, 12–20 cm. long, puberulous upwards, naked for about 2 cm. at the base, angled by the decurrent nodes; flowers solitary or more usually twin, rarely 3 together; bracteoles triangular, minute; pedicels 1–1.2 mm. long. *Calyx* narrowly campanulate, 2.5 mm. long, more or less 5-angled, produced 0.7 mm. above the ovary, clothed within with appressed ascending hairs; teeth 5, triangular, minute. *Corolla* fleshy; tube cylindric and 5-fluted below, suddenly much widened at the mouth, 2.5 mm. long; lobes 5, overlapping to the left in bud, ovate, rounded, 2 mm. long, mouth hairy. *Stamens* 5; filaments very short, attached a short distance below the mouth of the corolla; anthers linear, wider near the acute, shortly exerted apex, 2 mm. long. *Ovary* 2-celled; ovules 2 in each cell; style slender, 2.2 mm. long, shortly patently hairy except at the base; stigmas 2, ovate-lanceolate, 1.25 mm. long, puberulous without. *Fruit* (immature) pyriform, crowned by the appressed calyx-teeth, 7.5 mm. long, 3.5 mm. diam., black.

Batu Puteh, fl. May, *Arsat* in Herb. For. Dept. 1268. "Tree 30 ft. high, 6 in. diam." This species with 5-merous flowers requires an amplification of the generic description, all the other species being 4-merous. All other features are so distinctly those characteristic of *Petunga* that it cannot be excluded from that genus.

Payena Suringariana Burck [Sapotaceae].

Kuyuk Kabun, fl. April, *Arsat* in Herb. For. Dept. 1330. "Forest tree 20 ft. high, 8 in. diam.; fl. red. Orang Sungei name: *Ampalang*."

Symplocos superba Brand [Symplocaceae].

Forest Reserve Sandakan, 500 ft., fl. Feb., *H. G. Keith* in Herb. For. Dept. 1216. "Second forest growth shrub 10 ft. high; fl. white."

Linociera pluriflora Knobl. [Oleaceae].

The fruit was unknown when the species was described. Two sheets lying in the Kew Herbarium and others received recently, identified with this species, bear fruit; one sheet has both flowers and fruit. These specimens agree perfectly in the vegetative parts

with the sheet of the type number (*Beccari* 915) in the Kew Herbarium.

Drupe obovate-ellipsoid, woody, walls very thick, 0.8–1.5 cm. long, 0.6–1 cm. wide, dark-brown to black when dry, prominently warted, the warts rugulose. The bark of the twigs is whitish or pale-brown. All the specimens are from Borneo.

Sarawak, *Beccari* 3521; British North Borneo: East Coast, *Governor Creagh* (the description is mainly from this sheet, which also bears a flowering shoot); Tanjong Bulat, fr. Nov., *Arsat* in Herb. For. Dept. 1297. "A tree 80 ft. high, 25 in. diam."; Pin River, fl. Sept., *Arsat* in Herb. For. Dept. 1245. "A tree 40 ft. high, 12 in. diam.; fl. red. Orang Sungei name: *Parumpung*."

I suspect that *Linociera verruculosa* Merr. is this species, but I have not seen a specimen.

Rauwolfia sumatrana Jack [Apocynaceae].

Tanjong Pang, *Arsat* in Herb. For. Dept. 1207. "Forest tree 40 ft. high, 6 in. diam.; fl. yellow. Orang Dusun name: *Tambirag*."

Cinnamomum iners Reinw. [Lauraceae].

Tanjong Pang, fl. Feb., *Arsat* in Herb. For. Dept. 1208. "In forest; fl. yellow. Orang Sungei name: *Salimut*."

Litsea sebifera Bl. [Lauraceae].

Kamangsian, fl. June, *T. Goklin* in Herb. For. Dept. 1302. "Brunei name: *Anjarubi*."

Enkleia malaccensis Griff. [Thymelaeaceae].

Lunut, fr. Aug., *Arsat* in Herb. For. Dept. 1249.

Scurrula ferruginea Danser [Loranthaceae].

Batu Puteh, Kinabatangan, fl. June, *Arsat* in Herb. For. Dept. 1278.

Aleurites moluccana Willd. [Euphorbiaceae].

Sandakan, 120 ft., fl. Dec., *L. Apostol* in Herb. For. Dept. 1311. "Kemirih-Malay name: *Buaktas*."

Mallotus floribundus Muell.-Arg. [Euphorbiaceae].

Memampagar, Beaufort, 50 ft., fr. April, *Bayak* in Herb. For. Dept. 1290. "Tree 40 ft. high, 16 in. diam. Orang Murut name: *Marambokon*."

Ficus consociata Bl. [Moraceae].

Kuyak Kabun, fr. March, *Arsat* in Herb. For. Dept. 1325. "Tree 70 ft. high, 12 in. diam.; fr. green."

Castanopsis tungurru Bl. [Cupuliferae].

Beaufort, 60 ft., fr. May, *R. B. Cabiling* in Herb. For. Dept. 1312. "Tree 15 ft. high, 5 in. diam.; fr. green."

Vanilla Griffithii Reichb. f. [Orchidaceae].

Without locality, fl. Sept., *Md. Tahir* in Herb. For. Dept. 1233. "Fl. yellow."

Peliosanthes albida Baker [Haemodoraceae].

Lahad Datu, Tapadeng Hill, 350 ft., fr. Dec., *P. Orolfo* in Herb. For. Dept. 1315. "Fr. blueish."

XXIII.—CONTRIBUTIONS TO THE FLORA OF TROPICAL AMERICA: XI.* J. LANJOUW (Utrecht).

NEW EUPHORBIACEAE COLLECTED BY THE OXFORD UNIVERSITY
EXPEDITION TO BRITISH GUIANA, 1929.

Some Euphorbiaceae from the material collected by Mr. N. Y. Sandwith seemed at once very interesting to the present author, when they were shown to him by the collector during a visit to the Kew Herbarium. Mr. Sandwith was so kind as to lend him these specimens for determination. Both of them proved to be new species, while one of them could not even be placed in an already existing genus and a new genus has to be founded on it. The descriptions and some remarks follow.

Pausandra integrifolia Lanj., sp. nov.; ab omnibus speciebus hucusque cognitis floribus trimeris, petalis sicut sepalis liberis distinguitur.

Arbor parva. *Ramuli* tenues, teretes, glabri. *Folia* alterna, petiolata; petiolus 3-9 cm. longus, supra canaliculatus, apice incrassatus, pilis brevibus rigidis adpressis sparse vestitus, glabrescens; limbus 12-28 cm. longus, 4-9 cm. latus, oblongus vel oblanceolato-oblongus, basi acutus subcuneatus, apice longe cuspidato-acuminatus, acumine fere 1.5-2 cm. longo, rigide membranaceus vel subcoriaceus, ima basi glandulis binis minutissimis praedita, margine integerrimo vix revoluta, utrinque glaber, supra subnitidus olivaceo-brunneus, subtus opacus olivaceo-viridis, nervis utrinque praesertim subtus prominentibus costae arcuatae utrinque 12-14 nervatura tertia reticulata. *Flores* monoici. *Paniculae masculae* terminales, 20-35 cm. longae, rhachi gracili adpresse flavescenti-pilosa parte inferiore longiuscule ramosa, floribus in axillis bractearum parvarum intus glabrarum extus pilis flavis brevibus dense vestitarum glomerulatis, breviter pedunculatis, ramulis superioribus 1.5-4 cm. distantibus; pedicelli fere 5 mm. longi, pilis brevibus vestiti. *Sepala* 3, 4 mm. longa, late ovata, imbricata, apice et margine a vicinis tecto tenuia glabra imperfecta, ceterum extus pilis brevibus flavis adpressis dense vestita, intus fusca glabra. *Petala* 3, libera, fere 5 mm. longa, suborbicularia, concava, apice recurva, late truncata, margine revoluta, extus adpresse pilosa, intus glabra. *Discus* brevis, cupulatus, pilis longis flavis erectis dense vestitus. *Stamina* 8, quorum unum centrale, filamentis longis discum multo superantibus, gracilibus, atro-fuscis, glabris; antherae oblongae, introrsae, longitudinaliter dehiscentes, apice lato obtuso subtruncato. *Fructus* pedicello 14-37 mm. longo crasso sulcato pubescente apice incrassato suffultus, subglobosus,

*Continued from *K.B.* 1932, 93.

7-8 mm. diametens, pubescens, apice subapplanatus et reliquiis stylorum probabiliter indivisorum brevissimorum fortasse 1 mm. longorum coronatus, basi reliquiis disci ut in flore masculo probabiliter brevis cupulati pilis longis vestiti circumdatus, 3-locularis, seminibus statu sicco valde applanatis.

BRITISH GUIANA. Cuyuni River: plentiful in mixed hilly forest on right bank below Akaio Falls, November 22nd, *Sandwith* 650 (type); a low tree with pale green petals. Duplicates are distributed to Utrecht, New York, Rio de Janeiro and Berlin.

This species differs widely from the species which are at present known in the genus *Pausandra*, though the plant certainly belongs to it. The flowers are trimerous, and the petals as well as the sepals are free. By these characteristics alone one can distinguish the species from all the others. There is in this respect some similarity with *P. Martinii* Baill. but the latter species has different leaves and much smaller flowers (Mr. Eyma was so kind as to compare the plant with the specimen of *P. Martinii* in the Paris Herbarium). It is impossible to say whether the floral characteristics of *P. Martinii* resemble those of the new species, because there was no opportunity of studying flowers.

The characteristics by which the new species differs from all the others are, however, important enough to divide the genus *Pausandra* into two sections, of which descriptions and species follow beneath.

Sect. I. **Eupausandra** *Lanj.*, sect. nov.

Flores sympetali, lobis 5. Sepala connata. Folia dentata vel serrata.

P. Morisiana Radlk.; *P. megalophylla* Müll. Arg.; *P. Trianae* Baill.; *P. quadriglandulosa* Pax et K. Hoffm.; *P. macropetala* Ducke; *P. macrostachya* Ducke; *P. extorris* Standley; *P. flagellorhachis* *Lanj.*

Sect. II. **Pausandrella** *Lanj.*, sect. nov.

Petala 3, libera. Sepala 3, libera. Folia integra (an interdum dentata?).

P. integrifolia *Lanj.*; (?) *P. Martinii* Baill.

Sandwithia *Lanj.*, gen. nov.; *Euphorbiacearum* genus incertae sedis, probabiliter *Cluytieis* attribuendum, *Sagotiae* fortasse affine.

Flos masculus in alabastro globosus. *Sepala* 2 vel 3, valvata (an semper?), ovata, concava. *Petala* 3 vel 4, in alabastro valde imbricata, oblonga vel suborbicularia. *Disci glandulae* 2-4, episepalae, *Stamina* ultra 20, filamentis liberis, petalis subaequilonga; antherae erectae, oblongae vel ovato-oblongae, longitudinaliter dehiscentes. *Ovarii rudimentum* nullum. *Flos femineus* in alabastro oblongus. *Calyx* tubulosus, lobis 4, oblongis. *Petala* 4, parva, decidua. *Discus* tenuis, cupulatus, undulatus. *Ovarium* 3-loculare; styli 3, erecti, filiformes, basi connati, 2-partiti. *Ovula* in loculis solitaria, carunculis magnis coronata. *Capsula* tridyma, in coccos bivalves

a columella persistente dissiliens. *Semen* ovoideum carunculatum ; testa crustacea ; albumen carnosum ; cotyledones latae, planae.—*Arbores* glabrescentes. *Folia* alterna, petiolata, stipulata, integra, penninervia. *Flores feminei* in racemos terminales breves dispositi, pedicellati, bracteis mediocribus subtenti, ebracteolati. *Flores masculi* in paniculas racemos simulantes terminales breves dispositi, pedicellati, bracteis minutis vel nullis.



Fig. 1. *Sandwithia guyanensis* Lanj. Female flower (without petals).

***S. guyanensis* Lanj., sp. nov.**

Arbor parva, 6 m. alta vel altior, in silvis variis abundans. *Ramuli* juveniles sicut petioli pilis minutissimis adpressis sparse vestiti, mox glabrescentes, cinerascens, lenticellati. *Petiolum* supra canaliculatus, 1.5–3.5 cm. longus, paulo incrassatus et rugis transversis praeditus. *Stipulae* extus sparse praesertim in nervo mediano intus dense pilis flavis adpressis, eodem modo ut gemmae, vestitae, triangulari-ovatae, longe acuminatae. *Foliorum limbus* (4.5) 8.5–25 cm. longus, (1.5) 2.5–9.5 cm. latus, oblongus vel obovatus vel obovato-lanceolatus vel ellipticus, basi rotundatus vel acutus vel cuneatus, apice acuminatus vel cuspidato-acuminatus, integer, subchartaceus, glaberrimus, supra glaucescens, subtus brunneo-olivaceus ; costae secundariae utrinque praesertim subtus prominentes. *Flores masculi* in paniculas terminales dispositi. *Panicula* ramulum minutum abbreviatum lignescentem terminans, racemiformis, pilosa, e pedunculis unifloris fere 2 cm. longis composita. *Ramuli* parte lignescente 1 vel 2 gemmas ferentes, anno proximo paniculam secundariam procreantes. *Bractaeae* parvae, triangulares, pilosae, deciduae. *Pedicelli* sparse pilosi, 5–7 mm. longi. *Sepala*

2 vel 3, valvata (an semper ?), ovata, concava, 2-3 mm. longa, acuta, apice pilis penicillatis praedita. *Petala* 3 vel 4, alba, imbricata, oblonga vel suborbicularia, utrinque brevissime pubescentia, margine ciliata. *Disci glandulae* 2-4, episepalae, breves, crassae, squamiformes. *Receptaculum* pilosum. *Stamina* 23-26, filamentis liberis glabris petalis subaequilongis; antherae erectae, oblongae vel ovato-oblongae, connectivis basi dilatatis, longitudinaliter dehiscentes. *Flores feminei* in racemos terminales breves 2-3 cm. longos dispositi, rhachi pedicellisque sparse pilosis. *Bractae* mediocres, 4-5 mm. longae, triangulari-lanceolatae, acutae. *Pedicelli* 8-10 mm. longi. *Calyx* viridis, circiter 7 mm. longus, tubulosus, utrinque praesertim margine pilis minutis sparse vestitus, usque ad tertiam partem fere a basi incisus, lobis 4 oblongis obtusis. *Petala* 4, lanceolata vel oblonga, margine pilosa, minuta, decidua. *Discus* tenuis, cupulatus, undulatus. *Ovarium* 1.25 mm. longum, 3-loculare, densissime pilosum; styli 3, 9 mm. longi, basi 1.5 mm. connati, apice bipartiti, sparse pilosi. *Ovula* in loculis solitaria, carunculis magnis coronata. *Capsula* subglobosa, circiter 12 mm. longa. *Semen* ovoideum, 8-10 mm. longum, 5-6 mm. latum, brunneum, carunculatum.

BRITISH GUIANA. Moraballi Creek, Essequibo River, near Bartica, fl. and fr. August 26th, *Sandwith* 125a (type female), 125b (type male): a low tree, up to about 20 ft. high, plentiful in various types of forest; petals of male flowers pure white; female flowers green. Demerara River, fl. June, *Jenman* 6650 (male and female). On hills, Waini River, N.W. District, fl. November, *Anderson* (Forestry Department) 961 (male). Weri-Werai-Kuru Creek, Essequibo River, fl. August 1930, *Martyn* 197 (male). Bartica, fl. and fr. November 1888, *Jenman* 4817.

Mr. Paul Richards, who studied the ecology of the forests by the Moraballi Creek, writes that this small tree "occurred in all types of forest, but only very sparingly in Mora and Wallaba (one and three individuals over 4 ins. diam., respectively, on plots 400 ft. square); the greatest abundance was in Greenheart (52 individuals over 4 in. diam. on this plot), but the tree was also fairly abundant in Mixed and Morabukea."

This genus ought to be placed with the *Chrozophoreae*, and there somewhere near *Grossera*, by reason of its valvate male calyx, according to Pax and Hoffmann in *Natürliche Pflanzenfamilien*, Band 19 c (1931), though the species has not many other characteristics in common with this group. However, the importance of the valvate calyx should not be over-estimated, as is indicated by the following quotation from Bentham.* "No character, however important on some occasions, should be allowed to override all others on all occasions. The valvate male calyx, for instance, to which Mueller gives on most occasions so absolute a tribal value as to make the

*G. Bentham, Notes on Euphorbiaceae in *Journ. Linn. Soc. Bot.* xvii. 188 (1878).



Fig. 2. *Sandwithia guyanensis* Lanj. Inflorescence. a, short shoot of some years ago; b, short shoot of the last year; c, inflorescence-buds; d, axis; e, peduncle; f, pedicel.

most unnatural combinations, is never allowed even generic value by Baillon, because of its inconstancy in *Croton*, whereas in many cases it certainly has no exceptions." Besides, there seemed to be a slight indication of an imbricate calyx in a few cases. It will therefore be better to place the genus with the *Cluytieae* and, within this tribe, near *Sagotia*, though important differences still remain which distinguish this genus, as may be seen from the generic diagnosis. However, a better position could not be found.

The genus has been named after Mr. N. Y. Sandwith, who has done much work on the Guiana flora in general, and who also collected the type of this plant and traced several specimens which belong to this genus among the indeterminatae in the Kew Herbarium.

Duplicate material is available for the Herbaria of Utrecht, Rio de Janeiro, New York, Berlin and Paris.

XXIV.—AFRICAN ORCHIDS : III.* V. S. SUMMERHAYES.

Habenaria (§ Diphyllae) Lelyi Summerhayes, sp. nov. ; ex affinitate *H. Nicholsoni* Rolfe, *H. odoratae* Schltr. et *H. Debeerstinae* De Wild., a quibus petalis late lanceolatis subacuminatis a sepala dorsali liberis, labelli lobis lanceolatis medio lateralibus paulo latiore, brachiis stigmatiferis subfusiformibus differt.

Herba terrestris. *Folium* singulum, radicale, humistratum, suborbiculare, 2.5 cm. longum, 4.5 cm. latum, subcarnosum. *Scapus* erectus, 36 cm. altus, teres, cataphyllis acutis vel acuminatis vaginantibus instructus. *Racemus* ad 9-florus, 10 cm. longus ; bracteae lanceolatae, acuminatae, usque 2.5 cm. longae. *Flores* suberecti, albi. *Sepalum* intermedium lanceolato-ovatum, acutum, 7 mm. longum, 3.5 mm. latum, concavum, trinervium ; sepala lateralibus oblique lanceolata, subacuminata, 8.5 mm. longa, 4 mm. lata. *Petala* late lanceolata, subfalcata vel fere recta, subacuminata, 7 mm. longa, 3 mm. lata. *Labellum* trilobum, parte basali indivisa 2.5 mm. longa ; lobus intermedius anguste lanceolatus, acutus, 7 mm. longus, 2.25 mm. latus ; lobi laterales lineari-lanceolati, acuti, intermedio aequilongi, 1.5 mm. lati ; calcar dependens, gracile, apicem versus leviter ampliatus, fere 3 cm. longum. *Anthera* erecta, 2.5 mm. alta, canalibus brevibus circiter 0.5 mm. longis ; brachia stigmatifera subfusiformia.

NORTHERN NIGERIA. Ropp, 1380 m., July 1921, *Lely* 457.

This species belongs apparently to a small group in sect. *Diphyllae* possessing simple petals. Nine other species have been described but it is doubtful if they are all distinct. *H. Lelyi* is apparently rather isolated in this group, the free petals being a distinctive character. In addition it differs from all the other species in having the middle lobe of the lip wider than the lateral lobes.

Habenaria Johnsoni Rolfe in Dyer, Fl. Trop. Afr. vii. 571 (1898).

A re-examination of the type specimen shows that there are several very serious errors in the original description of this species.

In the first place Rolfe states that the petals are simple, and by assigning it to No. 33b in the Flora suggests that its affinity is with *H. Nicholsoni* Rolfe or perhaps *H. vaginata* A. Rich. Now the general structure of the flower is totally at variance with these species, but on the other hand agrees very closely with that of *H. stylites* Rchb. f. et S. Moore, *H. subarmata* Rchb. f., *H. armatissima* Rchb. f. and other allied species, all of which possess bipartite petals. The rather poorly preserved flower available for dissection from the type of *H. Johnsoni* also was found to possess an anterior segment to one of the petals, the corresponding segment on the other petal having been broken off. The segment found is very narrow and was obviously overlooked by Rolfe.

In the second place the spur is described as being 1 lin. (2 mm.) long in the original description. This is evidently a typographical error for 11 lin. (23 mm.), as an examination of the flower shows.

*Continued from *K.B.* 1931, 390.

The description should therefore be amended as follows :—

“ *Petala* bipartita ; partitio posterior lineari-lanceolata, falcata, 9 mm. longa, 1·5 mm. lata, sepalo intermedio agglutinata ; partitio anterior linearis, subacuta, 8·5 mm. longa, 0·4 mm. lata. *Calcar* cylindricum, rectum, 23 mm. longum.”

H. Johnsoni is very closely allied to *H. stylites* and indeed may yet prove to be conspecific with the latter, representing merely a small under-developed specimen. In the material at present available they differ in the following points. In *H. Johnsoni* the plant is much smaller while the perianth segments are smaller. The lip is, however, about the same length, but whereas in *H. stylites* it is divided for three-quarters of its length, in *H. Johnsoni* the lobes and undivided part are equal in length. Moreover the lobes are all considerably wider in Rolfe's species than in *H. stylites*. The gynostegium agrees very well in the two species. In view therefore of the considerable geographical remoteness of the two species and the above features it seems desirable for the present to keep them distinct.

Habenaria cirrhata Rchb. f. in Flora, 1865, 180. *H. Schweinfurthii* Rchb. f. Otia Bot. Hamburg. i. 58 (1878). *H. Zenkeriana* Kraenzl. in Engl. Jahrb. xix. 247 (1894). *H. longistigma* Rolfe in Dyer, Fl. Trop. Afr. vii. 248 (1898). *H. Dawei* Rolfe in Kew Bull. 1912, 154. *H. megistosolen* Schltr. in Engl. Jahrb. liii. 512 (1915).

A careful examination of the type specimens of all the above species except *H. Schweinfurthii* convinces me that it is impossible to separate them by any constant characters. Indeed there is considerable variation in the length of the parts, particularly the spur, and in the shape and size of the leaves. I have been fortunate in being able to examine a number of different gatherings from a relatively limited area (Northern Nigeria), and among these, coupled with considerable constancy in the reproductive organs, I have found even greater variety in the other floral members and vegetative parts than can be found in all the “ species ” cited above.

Schlechter states that *H. cirrhata* is confined to Madagascar, without indicating in any way how it differs from the Tropical African species he recognises ; there seem to be no significant differences between them. It should be noticed that Rolfe's description in the Flora of Tropical Africa, which, judging from his comments, was drawn up from Madagascar specimens, is wrong in several particulars. Among others the lengths of the anterior and posterior segments of the petals have been transposed ; it is the anterior lobe which is the longer.

I have been unable to examine the type specimen of *H. Schweinfurthii* Rchb. f., which is apparently at neither Berlin nor Vienna, but from the description I think there is no doubt that it is the same as *H. cirrhata* Rchb. f.

As a result of the above reductions the distribution of *H. cirrhata* Rchb. f. is seen to extend from Togoland in the west to Madagascar in the east and from Abyssinia in the north to Nyasaland and Rhodesia in the south, practically the whole of Tropical Africa south of the Sahara.

Habenaria Holubii Rolfe in Dyer, Fl. Trop. Afr. vii. 249 (1898). *H. rhopaloceras* Schltr. in Warb. Kunene Samb. Exped. 207 (1903). *H. valida* Schltr. in Engl. Jahrb. xxxviii. 148 (1906). *H. Hennigiana* Schltr. in Engl. Jahrb. liii. 511 (1915).

On examination of the type specimens of the above "species" it is clear that they are all conspecific and the oldest epithet, *Holubii*, must therefore be adopted for the species. It is not clear in what ways Schlechter considered his species to differ from one another, and indeed I have been unable to find any satisfactory differences. The shape of the leaves differs in individuals, while the relation between the lengths of the middle and side lobes of the lip is also a variable character; the middle lobe, however, is always distinctly longer than the lateral ones. In a series of specimens from Northern Nigeria the variation in this respect is well shown.

The key on page 211 of the Flora of Tropical Africa is extremely misleading since it reads:—

"Side lobes of lip twice as long as the front lobe

105 *H. rhopalostigma*

106 *H. Holubii*."

A comparison with the description on page 249 and with the specimen shows that in *H. Holubii* it is the front lobe which is much the longer. The species is thus distributed from Togoland and Nigeria through the Belgian Congo into southern Tanganyika Territory, Angola and Bechuanaland.

Habenaria (§ Ceratopetala) phylacochaيرا Summerhayes, sp. nov.; verosimiliter *H. Holubii* Rchb. f. affinis, a qua foliis floribusque minoribus, petali lobo posteriore lanceolato, anteriore polliciformi quam posteriore triplo breviori facile distinguenda.

Herba terrestris, 30–45 cm. alta. *Folia* dua infima ad vaginas reducta, superiora 6–7 lanceolata, acuta, basi vaginantia, usque 8 cm. longa et 2 cm. lata, sursum sensim decrescentia summo caule in bracteas abeuntia. *Racemus* pauciflorus, floribus inclusis usque 8 cm. longus; bracteae lanceolatae, acutae vel acuminatae, 2–4 cm. longae, ovario pedicellato multo breviores. *Flores* satis magni, suberecti, partim virides, partim albi, glabri. *Sepalum* intermedium oblongo-ovatum vel elliptico-ovatum, obtusum, 11–12 mm. longum, 7 mm. latum; sepala lateralia oblique semi-obovata, apiculata, 12–14 mm. longa, 7–8 mm. lata. *Petala* tribus quartis superioribus bifida, in toto 9–10 mm. longa; lobus posterior lanceolatus, acutus, 6 mm. longus, 2–2.5 mm. latus; lobus anterior curvato-polliciformis, apice rotundatus, 2 mm. longus, 1 mm. latus. *Labellum* trifidum; pars indivisa 2.5–4.5 mm. longa, 2 mm. lata; lobus

intermedius linearis, acutus, 10–12 mm. longus, 1–1.75 mm. latus; lobi laterales intermedio similes, 3–5 mm. longi, 0.5 mm. lati; calcar dependens, medio gracile, apice valde inflatum, 3–4 cm. longum. *Anthera* erecta, 5–6 mm. alta, canalibus leviter incurvatis 8.5 mm. longis. *Brachia* stigmatifera porrecta, apice valde incrassata connata, 9–10 mm. longa; rostellum lobus intermedius elongato-triangularis, 3 mm. longus, basi 1.5 mm. latus. *Ovarium* 2.5–3 cm. longum.

NORTHERN NIGERIA. Ropp, 1380 m., July 1921, *Lely* 451 (type). Vom, Bauchi Plateau, 800–1350 m., *Dent Young*.

It is difficult to say from inspection whether this remarkable species bears in addition radical leaves or not, although the cauline ones certainly seem inadequate. Probably the nearest relative of the species is *H. Holubii* Rchb. f. in which, however, the petal segments are totally different, while the flowers are considerably larger. The almost complete suppression of the anterior petal-lobe, which in sect. *Ceratopetalum* is usually so long and fleshy, is a striking feature of *H. phylacoeira*. The name, which is derived from φύλαξ, a guard and χείρ, a hand, is given in allusion to the position of the peculiarly shaped petals on each side of the anther.

Habenaria obovata Summerhayes, sp. nov.; *H. epipactideae* Rchb. f. similis, sed foliis pro rata latioribus, floribus bene minoribus, labelli lobis lateralibus intermedio paulo longioribus facile distinguenda.

Herba terrestris 15–30 cm., rarius usque 40 cm., alta. *Folia* 3–4, caulis basin versus exorientia, lanceolata vel oblongo-lanceolata, acuta, basi vaginantia, usque 9 cm. longa et 1.7 cm. lata, superne in bracteas descrescentia. *Racemus* anguste cylindricus, 5–11 cm. longus, usque 2 cm. diametro, subdense pluri- vel multi-florus; bracteae lanceolatae, acuminatae, 7–17 mm. longae. *Flores* adscendentes, virides. *Sepalum* intermedium oblongo-ovatum, subacutum, 5 mm. longum, 2.5–3.5 mm. latum; sepala lateralia oblique semiovata, subacuta vel obtusa, acuminata, 5–6 mm. longa, 2.5–3 mm. lata, reflexa. *Petala* oblique obovata, obtusissima, margine anteriore dilatata, distincte venosa, 3.5–5 mm. longa, supra medium 3–4 mm. lata. *Labellum* ex ungue 2.5–3 mm. longo tripartitum; partitio intermedia linearis, 5–6 mm. longa, 0.8–1 mm. lata; partitiones laterales lineares, plus minusve falcatis recurvatae, 5.5–6.5 mm. longae, 0.6–0.8 mm. latae; calcar dependens, apice unilateraliter valde inflatum, 10–13 mm. longum. *Anthera* inclinata, 2.75 mm. longa, canalibus brevibus. *Brachia* stigmatifera apice valde incrassata, 2.5–3 mm. longa. *Ovarium* circiter 1 cm. longum.

CAMEROONS. Cameroons Mountain: upper slopes, 2400 m., Johnston 29 (type); 2100–3000 m., very frequent, Dec. 1929, Maitland 804; no precise locality, comm. 1896, Miss Kingsley.

A remarkable species without any near relative known to me. The obovate very broad petals are also found in *H. epipactidea*

Rchb. f. and its allies, but there is otherwise little in common between the two species. *H. obovata* seems to be confined to the upper slopes of the Cameroons Mountain.

The structure of the column, with its two somewhat diverging arms bearing the anther loculi at each end, is reminiscent of the structure in sect. *Multipartitae* and indeed there is nothing fundamental in the flower at variance with the characters of that section. In this connection it is interesting to note that in *H. rhombocorys* Schltr. the side lobes of the lip are entire, but the structure is otherwise that of sect. *Multipartitae*. *H. obovata* differs so much, however, from the species of the section that it seems scarcely advisable to include it.

Habenaria Walleri Rchb. f. in Otia Bot. Hamburg. 98 (1881).
H. Soyauxii Kraenzl. in Engl. Jahrb. xvi. 93 (1892).

Examination of the type specimens of the two species leaves no doubt that they are the same. The species is widely distributed in Tropical Africa, occurring from Northern Nigeria through the Cameroons to Uganda and the Sudan in the north and Nyasaland and the Zambesi in the south-east.

Habenaria longirostris Summerhayes, sp. nov.; species valde insignis perianthii segmentis angustis elongatis linearibus vel lanceolatis acuminatis, petalis longiuscule ciliatis, rostellii lobo intermedio elongato truncato apice leviter 3-dentato supra antheram valde eminente, stigmatibus pro rata brevibus distinctissima.

Herba terrestris, usque 60 cm. alta. *Folia* 4-7, 2-3 infima ad vaginas reducta, intermedia lanceolato-ovata usque late ovata, acuta vel subacuminata, basi vaginantia, usque 13 cm. longa et 5 (rarius 7-5) cm. lata, infra inflorescentiam subito descrescentia, suprema bracteae similia. *Racemus* cylindricus, subdense vel dense multiflorus, 12-30 cm. longus, circiter 6 cm. diametro; bracteae late lanceolatae vel lanceolatae, acuminatae, 1.5-3.5 cm. longae, ovarium pedicellatum aequantes vel superantes. *Flores* adscendentes vel erecto-patentes, magni, petalis et sepalo intermedio albidis exceptis virides, saepe olivaceae. *Sepalum* intermedium lanceolatum, acutum, concavum, 12-18 mm. longum, 2.5-3 mm. latum, trinervium; sepala lateralia oblique falcatis lanceolata, basi margine antice rotundata dilatata, acuminata, 16-20 mm. longa, 4-5 mm. lata. *Petala* duobus trientibus superioribus biloba, dimidio inferiore cum sepalo intermedio conglutinata, marginibus praesertim superne dense longiuscule ciliata, in toto 13-18 mm. longa, basi 1.25-2 mm. lata; lobi lineares, acuti, posterior 9-12 mm. longus, 0.75 mm. latus, anterior 7-10 mm. longus, posteriore angustior. *Labellum* ex ungue 4-5 mm. longo et 2 mm. lato tripartitum, partitionibus anguste linearibus acutis plus minusve incurvatis, intermedia 17-23 mm. longa, lateralibus 15-18 mm. longis; calcar basi tenue, superne modice ampliatum, subacutum, 15-20 mm. longum. *Anthera* erecta, 2.5-3 mm. alta, canalibus gracilibus leviter incurvatis

2.5-3 mm. longis, staminodiis oblongis brevibus circiter 0.7 mm. longis. *Brachia* stigmatifera crassiuscula, apice incrassata, 3-4 mm. longa; rostellus lobus intermedius basi triangularis, superne anguste oblongus, apice truncatus leviter 3-dentatus, 4-5 mm. longus, antheram valde superans, dense papillatus. *Ovarium* 10-16 mm. longum, saepius curvatum.

NORTHERN NIGERIA. Naraguta, July 1921, *Lely* 462 (type); Vom, Bauchi Plateau, 900-1350 m., *Dent Young*; plains, August 1930, *Lely* P630; no locality, August 1912, *Nelson* 13.

Vernacular name: *Karren daji* (Hausa).

A remarkable species for which I can find no near relative. Especially noteworthy are the densely ciliate petals, the remainder of the flower being completely glabrous.

XXV.—ON THE FLORA OF THE NEARER EAST: XI.*

A CONTRIBUTION TO THE FLORA OF ALBANIA. W. B. TURRILL.

The mountainous kingdom of Albania, situated about the centre of the western part of the Balkan Peninsula, with an area of 27,538 sq. km. (The Near East Year Book, 1931-32, p. 9), is still one of the botanically lesser-known areas of south-eastern Europe. In spite of several valuable post-war botanical investigations, much more information is needed concerning the composition of its flora and the distribution of the component species before it is possible to solve many of the interesting phytogeographical problems which puzzle botanists familiar with the Balkan Peninsula. The replacement from north to south of an Alpine by a Greek high-mountain flora is one of the more important of those problems whose solution must be sought in Albania.† It has, therefore, been thought advisable to publish a list of the plants collected in various parts of Albania, especially on the mountains, by Dr. P. L. Giuseppi, during two journeys in 1929 and 1930. The specimens on which the list is based have been presented to the Herbarium by Dr. Giuseppi. In addition he has cultivated in his garden many species which I have been allowed to study alive, and has very generously presented several living specimens to Kew.

A few specimens collected in the neighbouring districts of Yugoslavia (N. Macedonia, etc.) and Epirus are included.

Clematis Viticella L. Between Scodra and Antivari, 200 m., 4.7.1929, No. 15A.

Ranunculus Wettsteinii Dörf. Chafa Jamit, Albanian-Serbian frontier (Kapa Jamit in Serbian), 2460 m., 12.7.1930, No. 66.

Alyssum murale W. et K. ? (material incomplete). Hillsides on way to Mal i Dejs, 155 m., 20.6.1930, No. 12.

Aubrieta sp. Smolika, 2150-2770 m., 2.7.1930, No. 49. Only a very small flowering specimen, unmatched with any species previously

*Continued from *K.B.* 1931, 455.

†See Turrill, *The Plant Life of the Balkan Peninsula* (Oxford, 1929), 406-413.

known from the Balkan Peninsula but either *A. olympica* Boiss., Flor. Or.i.251 (1867), or a species closely allied and possibly new.

It seemed probable from the Kew material that *A. olympica* Boiss., as originally described, might be a mixture. Prof. Chodat of Geneva very kindly lent us Boissier's types and our suspicion was confirmed. Boissier's own material has glabrous fruits and nearly glabrous vegetative parts. Specimens now in Herb. Kew., collected "above the plateau, 1862 June," on the Bithynian Olympus by J. Stuart Mill, have been matched with Boissier's material. Clementi's collecting "in rupestribus alpinis Olympi bith." consists of a very different plant with longer, narrower fruits covered with stellate or forked hairs, and all the vegetative parts are also provided with numerous stellate hairs. A plant at Kew, collected by Noé on the Bithynian Olympus, agrees with Clementi's material except that it has relatively long simple hairs, in addition to stellate ones, on the stems and leaf bases. Boissier's own material is taken as the type of *A. olympica* and his original description has to be modified so far as to exclude Clementi's plant; thus the plant should be described as "glabrescens" and the fruits as "oblongis 4-6 lin. longis (excl. stylis) glabris." Boissier's own specimens have no flowers.

Giuseppi's plant is very similar indeed to Mill's and differs only in having a few stellate hairs on the flower stalks, a very few on the ovary, and slightly broader laminae to the petals.

Barbarea bracteosa Guss. Mal i Dejs, 2150 m., 22.6.1930, rocks, No. 24.

Thlaspi praecox Wulf (?). Smolika, 2610 m., 2.7.1930, No. 52.

Viola albanica Hal. Smolika, 2300 m., 2.7.1930, No. 50A.

Viola dukadjinica W. Becker e descr. Chafa Shtetgut, 1940 m., 15.6.1930, alpine meadows, No. 8.

Viola gracilis S. et S. Mal i Dejs, 2150 m., 22.6.1930, alpine meadows, No. 34.

Viola heterophylla Bertol. var. *graeca* W. Becker. Smolika, 2460 m., 2.7.1930, No. 50.

Viola odorata L. Chafa Valbone, 1700 m., 16.6.1930, No. 3.

Viola saxatilis Schmidt subsp. *aetolica* Hayek. Woods on way to Mal i Dejs, 155 m., 20.6.1930, shady glens, No. 16. Not typical, the leaves somewhat broader than usual and the stipules very narrow. The identification is somewhat doubtful.

Dianthus deltoides L. var. *motinensis* Degen e descr. Ljubeten, N. Maced., 2150 m., 8.7.1930, meadows, No. 59.

Dianthus integer Vis. Ljubeten, N. Maced., 2210 m., 8.7.1930, meadows, flowers snow white, No. 62.

Dianthus sylvestris Wulf. subsp. *eusylvestris* Hayek. Near Antivari, 200 m., 4.7.1929, No. 3A; Mali Krag, Scutari, 200 m., 3.7.1929, No. 5A.

Kohlruschia prolifera Kunth. Near Rijeka, Montenegro, 100 m., 7.6.1929, No. 8A.

Minuartia Baldaccii (Hal.) Mattf. Smolika, 2.7.1930, 2300 m., No. 53.

Silene Armeria L. Hillsides on way to Mal i Dejs, 300 m., 20.6.1930, No. 17. A rather lax form, recalling plants received from Thrace, but evidently coming within the range of fluctuation shown by this species.

Silene quadridentata Pers. subsp. *albanica* Neum. Ljubeten, N. Maced., 2150 m., 2.7.1930, meadows, No. 60.

Linum capitatum Kit. Ljubeten, N. Maced., 2150 m., 8.7.1930, meadows, No. 88.

Linum tenuifolium L. Near Rijeka, Montenegro, 100 m., 4.7.1929, white-flowered, No. 6A.

Geranium bohemicum Torn. On way to Oloman, 1410 m., 23.6.1930, woodland, No. 37.

Rhamnus fallax Boiss. Korab, N. Maced., 1500 m., 29.6.1929, small tree, No. 16A.

Lathyrus grandiflorus S. et S. On way to Chafa Jamit, 1080 m., 12.7.1930, in fields, No. 67.

Geum coccineum S. et S. Ljubeten, N. Maced., 1840-2150 m., 8.7.1930, meadows, No. 61.

Rosa pendulina L. sensu lato (specimen without fruit). Oloman, 1350 m., 23.6.1930, on rocks, about 8-18 inches high, No. 42.

Saxifraga porophylla Bertol. var. *montenegrina* Engl. et Irmsch. Chafa Valbone, 1990 m., 16.6.1930, on alpine rocks, No. 7.

Saxifraga porophylla Bertol. var. *Sibthorpiana* Engl. et Irmsch., forma *thessalica* Engl. et Irmsch. Mal i Dejs, 1990-2090 m., 22.6.1930, on rocks, No. 33.

Saxifraga porophylla Bertol. var. ? Treska Gorge, N. Maced., 370 m., 7.7.1930, cliff sides, No. 87.

Saxifraga taygetea Boiss. et Heldr. Oloman, 1900 m., 23.6.1930, shady rocks, No. 40.

Punica Granatum L. Mati bridge, 100 m., 3.7.1929, No. 14A.

Bunium montanum Koch (?). Mal i Dejs, 2150 m., 6.1930, meadows, No. 28.

Trinia glauca L. Chafa Valbone, 1840 m., 16.6.1930, No. 1.

Putoria calabrica Pers. Near Struga, N. Maced., 280 m., 1.7.1929, No. 19A.

Valeriana montana L. Mal i Dejs, 2030 m., 22.6.1930, rocks, No. 26.

Achillea Aizoon Griseb. Mali Hat, N. Maced., 450 m., 26.6.1929, No. 10A.

Leontodon asper Poir. Hillsides on way to Mal i Dejs, 308 m., 20.6.1930, No. 14.

Scolymus hispanicus L. Roadsides through Albania, 3.7.1929, No. 4A.

Scorzonera austriaca Willd., dwarf form. Smolika, 2600 m., 2.7.1930, No. 54.

Senecio abrotanifolius L. On an unnamed mountain one mile south of Chafa Jamit, 2460 m., 12.7.1930, fields, No. 69.

Taraxacum laevigatum DC. Chafa Valbone, 16.6.1930, 1550 m., No. 3A.

Xeranthemum annuum L. Roadside, Babuna Pass, N. Maced., 770 m., 19.6.1929, No. 12; gorge of Struma, N. Maced., 400 m., 1.7.1929, No. 18A.

Asyneuma limonifolium Janch. Mali Hat, N. Maced., 1450 m., 26.6.1929, No. 9A; road below Oloman, 920 m., 24.6.1930, wet meadows, No. 44.

Campanula Hawkinsiana Hausskn. et Heldr. Smolika, 2150 m., 3.7.1930, No. 47.

Campanula hemschinica C. Koch (?). Ljubeten, N. Maced., 1230 m., 8.7.1930, meadows, No. 63.

Hedraeanthus graminifolius DC. Krstac, Yugoslavia, 2370 m., 16.7.1930, limestone screes, No. 70.

Hedraeanthus tenuifolius DC. Ljubeten, N. Maced., 2150 m., 8.7.1930, meadows, No. 64; near Rijeka, Montenegro, 100 m. 4.7.1929, No. 7A; Ljubeten, 2150 m., 8.7.1930, meadows, No. 64 (a depauperated form).

Pyrola chlorantha Sw. Smolika, 1840 m., 2.7.1930, in woods, No. 55.

Androsace hedraeantha Griseb. Chafa Jamit, 2460 m., 12.7.1930, screes, No. 48; Korab, N. Maced., 2300 m., 11.7.1930, screes, No. 65.

Moltkia petraea Griseb. Roadside between Oloman and Chafa Moreze, 1080 m., 24.6.1930, on rocks, No. 43.

Linaria peloponnesiaca Boiss. et Heldr. Road below Oloman, 920 m., 24.6.1930, wet meadows, No. 45.

Pedicularis brachyodonta Schloss. et Vuk., subsp. *Grisebachii* (Wettst.) Hayek. Mal i Dejs, 1990 m., 22.6.1930, meadows, No. 35.

Veronica austriaca L., subsp. *Jacquinii* Maly. Chafa Valbone, 1550 m., 16.6.1930, No. 5.

Veronica saturejoides Vis. Mal i Dejs, 2150 m., 22.6.1930, alpine rocks, No. 37.

Wulfenia Baldaccii Degen. Chafa Stogut, 1940 m., 15.6.1930, alpine rocks, No. 9; Chafa Shtetgut, 1470-1700 m., 17.6.1930, alpine rocks, No. 10. See also Nos. 76, 76A (*Kew Bull.* 1930, p. 124).

Pinguicula hirtiflora Ten. Near Elbasan, 123 m., 1.7.1929, No. 20A. Pale blue flower with white centre.

Ramondia Nathaliae Panč. et Petrov. Treska Gorge, N. Maced., 370 m., 7.7.1930, cliffs.

Ramondia serbica Panč. Near Dibra, N. Maced., 215 m., 29.6.1929, No. 21A.

Globularia cordifolia L. Chafa Valbone, 2000 m., 16.6.1930, No. 6.

Lamium garganicum L. var. *glabratum* Briq. Mal i Dejs, 1840 m., 22.6.1930, meadows, No. 27.

Salvia ringens S. et S. Intermediate between the varieties *macedonica* and *Baldacciana* Briq. (in Ann. du Cons. et du Jard.

Bot. Genève ii. 123-4, 1898). These, together with the var. *olympica*, are doubtfully distinct even as varieties. Hillsides on way to Mal i Dejs, 308 m., 20.6.1930, No. 15.

Sideritis Roeseri Boiss. et Heldr. Mali Hat, N. Maced., 1450 m., 26.6.1929, No. 11A.

Stachys germanica L. Road below Oloman, 1230 m., 24.6.1930, wet meadows, No. 46.

Stachys scardica Griseb. Hillsides on way to Mal i Dejs, 308 m., 20.6.1930, No. 13.

Teucrium Polium L. Albania, 200 m., 3.7.1929, common by roadside, No. 17A.

Daphne oleoides Schreb. var. *glandulosa* (Bert.) Keissl. Oloman, 1940 m., 23.6.1930, alpine meadows, No. 38; Mali Hat, N. Maced., 1600 m., 22.6.1930, No. 2A. Small bush 1½-2 ft. high with sweet-smelling white flowers.

Himantoglossum hircinum Spreng. On road to Chafa Dejs, 150 m., 20.6.1930, No. 11.

Orchis sambucina L. Mal i Dejs, 1990 m., 22.6.1930, purple flowers, No. 30.

Crocus veluchensis Herb. Mal i Dejs, 2150 m., 22.6.1930, No. 29.

Narcissus radiiflorus Salisb. Mal i Dejs, 2150 m., 22.6.1930, rocks and meadows, large white flowers, No. 25.

Narcissus tubulosus Baldacci, e descr. Smolika, 2400 m., 2.7.1930, rocky slopes, tepals white with yellow-orange corona, No. 71.

Erythronium Dens-canis L. Oloman, 1970 m., 23.6.1930, No. 41.

Fritillaria macedonica Bornm. e descr. Mal i Dejs, 2610 m. (summit) and down to 1990 m., 22.6.1930, No. 32.

Fritillaria neglecta Parl. Chafa Valbone, 1990 m., 16.6.1930, No. 2.

Lilium carniolicum Bernh. var. *albanicum* (Griseb). Mal i Dejs, 1840-2150 m., 22.6.1930, meadows and rocks, flowers brown (?), No. 36; Smolika, 2150 m., 5.7.1930, flowers yellow, No. 48; Korab, N. Maced., 1600 m., 29.6.1929, No. 13A (probably this variety).

Lilium Martagon L. var. *cattaniae* Vis. Near Dibra, N. Maced., 730 m., 29.6.1929, No. 12A. Very dull purple colour.

Tulipa australis Link. Smolika, 2300 m., 5.7.1930, No. 51.

***Scilla albanica* Turrill, sp. nov. ; a *S. messeniaca* Boiss. bulbis elongatis, floribus minoribus, ovario late obpyramidato differt.**

Bulbi elongati, 3.5 cm. longi, 1.1 cm. diametro, tunicis pallide brunneis. *Folia* 3, synanthia, linearia, plana, apice breviter subabrupte acutata, basi longe attenuata, 10 cm. longa, 4-8 mm. lata, glabra, nervis 13-19. *Scapus* gracilis, glaber, 10.5 cm. longus, racemo ovoideo 12-floro, pedicellis erecto-patulis 3-5 mm. longis, bracteis minutissime deltoideis 0.5 mm. longis. *Perigonii phylla* subpatentia, oblongo-elliptica, apice subobtusata et papillosa, 5 mm. longa, 1.5-2 mm. lata, caeruleo-violacea (?). *Filamenta* 3 mm. longa, apicem versus attenuata, basi vix dilatata, caeruleo-violacea ;

antherae atro-violaceae, 1.5 mm. longae. *Ovarium* late trigonobpyramidatum, 1.75 mm. longum, 1.75 mm. diametro; stylus 2.5 mm. longus.

ALBANIA. Oloman, 1900 m., 23.6.1930, on rocks, *P. L. Giuseppi* 39.

The species, *S. messeniaca* Boiss., with which *S. albanica* has been contrasted, is known only from the Peloponnese (Messenia, Laconia, and Arcadia). The more widely spread *S. bifolia* L. [with its varieties *nivalis* (Boiss.) Baker, and *polyphylla* Boiss.] is the only other species calling for immediate comment. *S. albanica* differs from *S. bifolia* in the shape of the bulb, the larger number of smaller flowers, the shorter pedicels, and the reduced number of ovules.

It should be remarked that two ovaries were dissected in drawing up the description. In one a single ovule was found, in the other no trace of ovules could be discovered.

XXVI.—PLANTS NEW TO ASSAM: IV.* C. E. C. FISCHER.

Impatiens puberula DC. [Geraniaceae].

Known from Sikkim and Nepal.

S. Lushai, near Lungleh, 4000 ft., flowers cream and pink, Nov., *W. J. L. Wenger* 388. "Found only in one damp, shaded spot." The colour of the corolla diverges from that of the type.

Acer Forrestii Diels [Aceraceae].

Known from Yunnan.

Delei Valley, 10,000 ft., fruit Sept., *Kingdon Ward* 8648. "A small (?) tree of the rain-forest in dense thickets on N. slope."

Acer Wardii W. W. Smith [Aceraceae].

Previously from Upper Burma.

Delei Valley, 8000–9000 ft., flowers May, *Kingdon Ward* 8138. "A medium-sized tree of the Rhododendron-Tsuga forest. Deciduous; young foliage copper-red; buds red."

Desmodium oblongum Wall. [Papilionaceae].

Reported from Burma.

S. Lushai Hills, 5000–6000 ft., flowers dark-blue, and fruit Dec., *W. J. L. Wenger* 361. "Whole plant very light and fairy-like. In open forest on edges of cliffs." Naga Hills at Shibong, 3000 ft., *A. Meebold* 6181.

Pueraria yunnanensis Franch. [Papilionaceae].

Described from Yunnan.

Lohit Valley, 3000–5000 ft., flowers Oct., *Kingdon Ward* 8720. "A climber in thickets and clearings along the edge of the jungle. Flowers white, tipped with violet."

Sonerila khasiana C. B. Clarke [Melastomaceae].

When describing this species in 1879, C. B. Clarke had four collections comprising a number of plants of uniform character

*Continued from *K.B.* 1931, 285.

before him. His description, therefore, was limited in scope. Further material from another locality, and departing somewhat from the type, being now available, an amplified description based on all the material will be useful, in view of the rather meagre account given by C. B. Clarke. One point calls for special remark. The original description states that the plant is stemless, but even among those specimens collected by Hooker and Thomson there are several with a distinct stem up to 1 inch long.

Sonerila khasiana C. B. Clarke in Fl. Brit. Ind. ii. 539 ; amplified description by C. E. C. Fischer.

Small herb. Roots fibrous. Stem usually solitary, succulent or wiry, slender, from very short to 3.5 cm. long, puberulous. Leaves fascicled at the apex of the stem and mixed with rufous bristles up to 8 mm. long, with sometimes one or two additional leaves and a tuft of bristles near the base and a puberulous but otherwise naked section between ; blade ovate, usually acute, base cordate, 1.6-4.4 cm. long, 1-2.7 cm. wide, palmately 5-nerved, with 2 more nerves arising a little higher and curving into the apex, all slightly prominent below, upper surface with scattered bristly hairs, lower rather more hairy, especially on the nerves, margins ciliate, more or less crenate-serrate ; petioles slender, 1.5-5.5 cm. long, glabrous or more or less crisped-rufous-hairy, often purplish. Peduncle terminal, slender, 1.5-7 cm. long, glabrous. Flowers 1-7 in an umbel with 1-3 minute linear-ensiform bracteoles at the base. Pedicels 1-1.4 cm. long, glabrous. Calyx narrowly turbinate, more or less trigonous, glabrous or with a very few spreading bristles, 4-5 mm. long, teeth small, triangular, acute. Petals broadly ovate, acute, 8 mm. long, mauve. Stamens equalling the petals, filaments slender, as long as the attenuate yellow anthers. Capsule narrowly oblong, 6-7 mm. long. Seeds minute, oblong, minutely papillose.

Khasia Hills : Mamloo and Kalapani, 4000-5000 ft., J. D. Hooker and T. Thomson ; Boga Pani Bridge, 3000 ft., flowers Sept., C. B. Clarke 40,340 ; Vale of Rocks, 5000 ft., fruit Sept., C. B. Clarke 45,454. Jaintea Hills at Jarain, 4000 ft., fruit Nov., C. B. Clarke 18,329. S. Lushai Hills, 4000 ft., flowers and fruit Sept., W. J. L. Wenger 345.

Sonerila tenera Royle [Melastomaceae].

From subtropical Western Himalayas and Chota Nagpur.

S. Lushai, Blue Mountain, 3000-4000 ft., flowers pale-pink, Nov., W. J. L. Wenger 395. "In thin grass at edges of dry hill-rice fields."

Sonerila villosa C. E. C. Fischer, sp. nov. [Melastomaceae]. *S. khasianae* C. B. Clarke peraffinis, caulibus petiolis pedunculis pedicellis albo-villosis, floribus minoribus.

Small herb. Roots fibrous ; rhizome creeping. Stem slender, very brittle, solitary, stems 2-3 fascicled, up to 3 cm. long, deep-crimson, more or less white-villous. Leaves few to many, aggregated at the apex of the stem, mixed with tufts of rufous bristles ; blade

broadly ovate to orbicular, apex rounded or narrowed and obtuse or subacute, base shallowly cordate, 1-3 cm. long, 0.5-1.8 cm. wide, palmately 5-nerved, with 2 more nerves arising a little higher and curving into the apex, upper surface with scattered crisped hairs from bulbous bases, lower more softly hairy, more densely so on the nerves, margins minutely crenate-serrate; petioles slender, 1-4 cm. long, more or less white-villous. *Peduncles* 1-2, terminal, slender, up to 5 cm. long, more or less white-villous. *Flowers* solitary, or 2-3 in an unbel. *Pedicels* 4-6 mm. long, with a few white hairs. *Bracts* 1-3 at the base of the pedicels, minute. *Calyx* narrowly turbinate, 3-4 mm. long, more or less spreadingly white-villous, teeth small, triangular, acute. *Petals* elliptic or elliptic-obovate, acute or cuspidate, 5-6 mm. long, mauve. *Stamens* slightly exceeding the petals, anthers attenuate, deep-yellow, 3-4 mm. long. *Capsule* campanulate, smooth, truncate, 4-6 mm. long.

S. Lushai Hills, from Lungleh to 70 miles South, 2500-4000 ft. flowers and fruit (seeds escaped) July-Aug., *W. J. L. Wenger* 323 (typus in Herb. Kew.). "Growing on wet rocks in deep shade, often clinging to the underside of overhanging rocks."

Begonia Wengeri C. E. C. Fischer, sp. nov. [Begoniaceae]; *B. alaeacidiae* C. B. Clarke affinis, foliis minoribus supra haud puberulo-punctatis subtus crispule pilosis, bracteis majoribus distincta.

Erect herb. *Rootstock* small, fibrous. *Stem* terete, wiry, sometimes rooting at the lower nodes, more or less densely clothed with crisped, fuscous or rufous hairs, 5-10 cm. high, usually forked near the base. *Leaves* membranous, rotund-ovate, inequilateral, acute, base shallowly cordate, 1.5-5.5 cm. diam., dark-green and sparsely hairy above, pale below and crisped-rufous-hairy on the nerves, especially near the base, 7-8-nerved, margins simply or doubly crenate with cilia between the crenatures and sometimes at their apices; petioles slender, 0.6-5 cm. long, crisped-fuscous- or rufous-hairy. *Stipules* ensiform, acuminate, sometimes toothed. *Peduncle*, its branches and pedicels densely hairy with crisped, multicellular, rufous hairs, often bearing reduced, petiolate leaves at the forks; bracts foliaceous, ovate to orbicular in outline, more or less deeply and sharply toothed or lobed, ciliate, up to 4 mm. long; pedicels capillary, up to 8 mm. long, lengthening in fruit. ♂ *flowers* with a perianth of 4 white segments, the 2 outer broadly obovate, obtuse, 3 mm. long, the 2 inner smaller, subacute. *Stamens* about 12, united below for 0.6-0.7 mm., filaments short, anthers oblong, 0.6-0.7 mm. long, connective shortly produced, conical. ♀ *flowers* with a perianth of 5 white, elliptic-oblong, obtuse segments, 2.5-3.5 mm. long, the innermost smallest. *Ovary* trigonous, 3.5 mm. long, puberulous on the angles; styles 4, shortly united at the base, minutely fuscous-puberulous; stigmas densely fuscous-hairy. *Capsule* 3-winged, 1 cm. long, 1.2 cm. across the wings at the truncate apex, its faces with a vertical median rib, green, glabrous or the margins of the wings with a few short hairs, one wing wider than the

other two, outer angles obtuse, faces splitting along the edge or the midrib. *Seeds* minute, oblong-ellipsoid, brown.

S. Lushai Hills, about 60 miles South of Lungleh, 1500–2000 ft., flowers and fruit Aug., *W. J. L. Wenger* 324 (typus in Herb. Kew.). "In dense patches on shady banks."

***Lactuca macrorhiza* Hook. f.** [Compositae].

Known from the Himalayas from Kashmir to Sikkim.

S. Lushai, Blue Mountain, 6500 ft., flowers clear pale-blue, Dec., *W. J. L. Wenger* 378. "Forming beautiful patches in crevices of rocks near the summit; the persisting decaying leaves give the plant an untidy appearance."

***Embelia Clarkei* Bedd.** [Myrsinaceae].

Found previously in Tenasserim.

Delei Valley, Chibaon, 5000–6000 ft., flowers April, *Kingdon Ward* 8035. "A climber of the temperate rain-forest (twiner); flowers green."

***Embelia myrtiflora* Hemsl. et Mez** [Myrsinaceae].

Known from China.

Delei Valley, 3000–4000 ft., fruit April, *Kingdon Ward* 8122. "A scrambling plant, sometimes ascending big trees and hanging down in flat, wave-like expansions. In thickets in open forest on steep slopes and banks."

***Swertia nervosa* Wall.** [Gentianaceae].

Described from temperate Nepal and Sikkim.

S. Lushai, Darjow Mountain, 5000 ft., *W. J. L. Wenger* 364. "In grassy glades in forest on summit."

***Swertia paniculata* Wall.** [Gentianaceae].

Known from the Himalayas from Kashmir to Nepal.

S. Lushai, Blue Mountain, 6000 ft., flowers blue, Dec., *W. J. L. Wenger* 362. "In grassy glades in forest."

***Lepidagathis hyalina* Nees**, var. ***aristata* C. E. C. Fischer**, var. nov. [Acanthaceae]; var. *semiherbaceae* C. B. Clarke similis sed foliis minoribus, bracteis bracteolisque aristatis.

Stems wiry, up to 25 cm. long. *Leaves* linear to narrowly elliptic, 1.6–5.5 cm. long, 0.3–1.2 cm. wide, glabrous, shining, dark-green above, pale below, narrowed at both ends, apex obtuse or acute, base decurrent into the short petiole, midrib and 7–9 pairs of lateral nerves prominent below, the latter uniting close to the slightly undulate margin. *Spikes* dense, up to 2.5 cm. long. *Bracts* and *bracteoles* aristate, brown or green, about 1 cm. long. *Corolla* white, spotted with brown.

Garó Hills: Siju, 2000 ft., flowers Nov., *Mrs. N. E. Parry* 1044 (typus in Herb. Kew.); Baghmara, 500 ft., *Mrs. N. E. Parry* 1046. Garó name: *Byiradimat Mengo Kime* (=plant resembling wild-cat fur).

Strobilanthes trichophorus C. E. C. Fischer, sp. nov. [Acanthaceae]; ex affinitate *S. monadelphi* Nees foliis brevissime petiolatis basi rotundatis vel leviter cordatis, inflorescentiae pilis longis albis, bracteis spathulato-obovatis recedit.

Undershrub. Stems woody, slender, erect, 15–35 cm. long, terete below, quadrangular upwards, sharply so and almost winged near the apex, hairy with long white spreading hairs above. *Leaves* membranous, elliptic-lanceolate, acute, base rounded or slightly cordate, 6–8 cm. long, 2–3 cm. wide, becoming smaller near the inflorescence, midrib and 5–9 pairs of lateral nerves slightly raised on both faces, pellucid-dotted, upper surface with numerous punctiform and shortly linear cystoliths, white-hairy and dark-green above, more sparsely hairy and pale below, margins undulate-crenate; petioles less than 2 mm. long. *Spikes* axillary, simple or with a short branch near the base, interrupted, up to 13 cm. long; rhachis sharply quadrangular, pubescent and beset with long, spreading, soft, white, septate hairs. *Bracts* in opposite pairs 5–6 mm. apart, spathulate-obovate, subacute, thick, green, 1.3 cm. long, 0.8 cm. wide, 5-ribbed, densely hairy on both faces with mixed short and long hairs, many of them gland-tipped, and with longer soft, white hairs. *Flowers* solitary in each bract. *Calyx* sessile, 1.1 cm. long, tube very short; segments 5, lorate, obtuse, green and with the same indumentum in the apical half as the bracts, brownish and glabrous below. *Corolla* ventricose with a very short narrowly cylindrical base, 1.6 cm. long, blue, sparsely hairy with gland-tipped hairs without, glabrous within except for a brush of white hairs behind the anthers and a few hairs at the insertion of the stamens. *Disc* annular. *Stamens* 4, in pairs. *Style* slender, as long as the corolla, apex recurved, undivided. *Ovary* oblong, glabrous; ovule 4. *Fruit* not seen.

Garó Hills, Emangiri, 2000 ft., flowers Nov., Mrs. N. E. Parry 1076 (typus in Herb. Kew.). Garó name: *Samboda*.

Strobilanthes glutinosus Nees (Acanthaceae).

From the Himalayas as far east as Nepal.

S. Lushai Hills, spur of Blue Mountain, 4000 ft., flowers Dec., W. J. L. Wenger 401. "In open grassy spaces."

Elsholtzia communis (Coll. et Hemsl.) Diels [Labiatae].

Found in W. China.

Lushai Hills, Tawipui, 2000 ft., flowers Jan., Mrs. N. E. Parry 462. "Flowers dull mauve." Lushai name: *Lengmasher*.

Dalechampia Kurzii Hook. f. [Euphorbiaceae].

Known from Burma.

S. Lushai Hills, 69 miles S. of Lungleh, 2500 ft., flowers Aug., W. J. L. Wenger 327. "Bracts palest green. Apparently rare, as it is unknown to the local people."

Rhynchanthus longiflorus *Hook. f.* [Zingiberaceae].

Originally from Burma.

S. Lushai Hills, 4000 ft., flowers deep-red, Sept., *W. J. L. Wenger* 353. "Stem 4 ft. high. Growing in crevices and forks of trees."

This plant was figured and described in 1886 in *Bot. Mag.* t. 6861 as the type of a new genus. It had been obtained from Burma by the nurserymen Messrs. Low, who presented it to Kew, where it flowered in a hot-house. Unfortunately the precise locality in Burma was not recorded. Since this first discovery the plant apparently had not been found again till now.

Polytoca Wallichiana *Benth* [Gramineae].

Reported from Burma.

S. Lushai Hills, 3000 ft., *W. J. L. Wenger* 354. "In open forest."

XXVII.—MISCELLANEOUS NOTES.

MISS MARIANNE HARRIET MASON.—We record with deep regret the death at her home at Rondebosch, Cape Town, on April 7th, of Miss M. H. Mason, whose African flower and landscape studies, which she presented to the Nation, are exhibited in Museum No. 4.

Miss Mason was an old and valued correspondent of Kew, her earliest communication being with Sir William Thiselton-Dyer when she sent a collection of dried North African flowers for the Herbarium. It was after her retirement from Government service in 1910 that her interest in the South African flora commenced, for shortly afterwards she went out to stay with her brother, Canon Edward Mason, Principal of St. Bede's College, Umtata, where she quickly set to work collecting seeds and specimens of the flora of the region, and making water-colour studies of the native vegetation. She did not confine her attention to the Umtata region alone, but travelled widely in the Cape peninsula, Pondoland, Rhodesia, Uganda and elsewhere, making sketches of the scenery and detailed studies of the plants wherever she went. A large number of her letters, preserved here, refer to consignments of seeds and bulbs which she sent to Kew. She was especially interested in the genus *Oxalis*, of which she sent many living specimens and she was also of great assistance in sending *Chironias* when the *Gentianaceae* were being studied for the *Flora Capensis*.

During one of her visits to England she brought over her large collection of plant studies and sketches, which were exhibited on several occasions in London, and suggested that they should be placed on exhibition at Kew. Though there was no very suitable place for the proper housing of her large series of drawings, arrangements were made for their display on the first floor of Museum No. 4 (Cambridge Cottage). A selection was made from the large number which she brought to Kew and these are now on exhibition in the Museum. Eventually Miss Mason most generously presented the whole of her collection of drawings to Kew as a gift to the Nation.

The larger pictures and some of the smaller plant studies are on exhibition in the Museum, but the majority of the smaller pictures are preserved in the Herbarium and Library. Her gift included one hundred and ten large pictures and five books of small plant studies, some of which are exhibited from time to time. Among the large pictures there are several paintings of the neighbourhood of Umtata, scenes in the Transkei and in the garden of St. Bede's College, all of which give a very vivid impression of the South African landscape. Her flower studies are particularly clear and convincing, some of the most striking being those of the Aloes, *Gladioli* and *Ixias*. In all her work she gave a very faithful impression of the plant she was drawing. Though she was in no sense a professional botanist and though her drawings may lack accuracy of detail, yet they represent in a remarkably effective way the plant she was studying, and probably give a better impression of the flowers than careful botanical drawings would have done; clean and vivid in their colouring they form a most interesting series of plant studies. She presented her last picture, painted when she was eighty-six years old, on her visit to England last autumn. This picture, now hanging in the Museum, shows seven species of *Protea* in flower, which were growing in the National Botanic Garden, Kirstenbosch, in July 1931. The species were sent to her on board ship at Cape Town and she painted them during her last voyage home.

Miss Mason was as keenly interested in gardening as she was in painting and her letters to Kew were always concerned with plants of both horticultural and botanical interest. Her energy and enthusiasm in many different directions were unbounded. Fearless and untiring, she pursued her numerous activities with her usual vigour, despite her advanced years, until the end of her useful life.

Miss Mason was born in February 1845 at Morton Hall, Nottinghamshire, and here she carried on her gardening activities and constructed a rock garden in the days when rock gardens were a novelty.

Outside botanical circles her name will live for the wide interest she took in social problems and for her work as first official Woman Inspector of boarded-out children. She will be remembered as the Doyenne of all the Women Inspectors in the Civil Service and the Children's Friend.

HARVEY MONROE HALL. The death of Dr. H. M. Hall in his fifty-eighth year will be widely regretted both on personal and scientific grounds. Dr. Hall graduated in the University of California in 1901 and became Assistant Botanist at the Experimental Station (1902-3), and eventually Professor at the University of California. At the time of his death he had been for some years on the staff of the Carnegie Laboratory, Stanford University. His earlier published work consisted largely of taxonomic studies on Californian plants. "A Yosemite Flora" (1912), written jointly with Mrs. Hall, was regarded by his fellow workers as a model of a

popular flora. His "Phylogenetic Method in Taxonomy," written in collaboration with F. E. Clements, employed statistical methods in the discrimination of subspecies and included phylogenetic charts indicating the author's views as to their inter-relationships. Hall's most important work was a monograph of "The genus *Haplopappus*" (1928), which is well illustrated and includes discussions of the relationships and ecology of each species.

Hall was a firm believer in international co-operation and interested himself greatly in type material preserved in the various herbaria of Europe. At the International Botanical Congress held at Cambridge in 1930 he provided a paper entitled "Proposals for an International Bureau of Plant Taxonomy."

In connection with his Transplant experiments Hall came into close touch with Kew, and it was as a result of a study of his work and methods, when the Director was lecturing at the University of California in 1926, that the Kew-Potterne Transplant experiments were initiated in collaboration with the British Ecological Society, and Hall was keenly interested in the English work. His own experiments, undertaken at first in association with F. E. Clements, were concerned with the transplanting of identical plants at different altitudes in several localities in Western California. Outline accounts of the methods employed and of some of the results obtained are given in the Carnegie Institution Year Books from No. 17 (1918) onwards.

Hall was always a welcome visitor and his untimely death in the prime of an active life is a great loss to botany and Kew is deprived of a valued friend and stimulating colleague.

The Cultivation of Geraniums for Essential Oil.—Owing to the interest at present taken in some of the Colonies in the cultivation of pelargoniums (geraniums) for essential oil, the following notes have been prepared from an article by A. Rolet which appeared in "L'Éclairer Agricole et Horticole" of November 1st, 1931.

Geraniums grown for perfumery should be propagated by cuttings in nursery beds. The practice of planting cuttings directly into the fields, such as is observed in Algeria and Italy, is not to be recommended, as the unrooted cuttings have little chance of surviving a period of drought. Cuttings may be made from August to October, the time depending on the climate, region and material available.

If protection, such as straw matting or frames, can be afforded they may be put in until February.

Healthy, well ripened shoots should be selected, for these ultimately give the greatest yield of leaves and essential oil. As it is difficult to get cuttings with a "heel" from young plants, ordinary cuttings, about 6 ins. long and $\frac{1}{4}$ in. across the base are used. The secondary branches and all the leaves except three below the terminal bud are removed and the base of the stem cut off a little

below the last bud with a sharp knife, as secateurs bruise the stem tissues, and render them more susceptible to disease. If large quantities of cuttings are made, the leaves taken off may be distilled. If disease is suspected, the cuttings may be immersed in a solution of corrosive sublimate [2 grammes to the litre] or in a 1 per cent. copper sulphate solution, then washed and dusted with powdered charcoal. It is unwise to make too many at a time and they should be kept fresh in wet sacking or in moist sand.

Some growers recommend that they be allowed to wilt a little before insertion. To reduce transpiration, part of the leaves must be cut back before they are "dibbled" in.

Beds about 3-4 feet wide should be made in a sheltered position with light and well drained soil and the cuttings set in rows from 6-8 ins. apart, with about 2 ins. between individual cuttings.

It is customary to "dibble" them in at a slant, inserting two-thirds of their length. They must be kept sufficiently moist and sheltered against excessive heat.

Especial care is necessary when frames are employed. New compost may be used or the old must be sterilized with carbon bisulphide or formalin.

The foliage should be sprayed frequently and watering withheld until the cuttings have taken root. Then air may be gradually admitted and moderate waterings given. To reduce the chances of fungoid attack, the leaves should be sprayed with weak Bordeaux mixture and dusted with sulphur. Yellow leaves and any sickly plants should be removed and burnt, and if the cuttings are very crowded, it may be advantageous to transplant. Potting up ensures that they may be planted out with a ball of earth.

A good light or medium soil should be selected, if possible one that is deep, slightly calcareous, rich in humus and retentive of moisture in summer or capable of being watered, for drought is detrimental to the development of the leaves and the quality of the essential oil. Heavy soils, being too retentive of moisture, favour diseases and produce oil of a poorer quality, and it is advisable to drain them. In very dry ground, the basal leaves turn yellow and fall, but diseases are more to be feared in wet soils. The soil in the Maritime Alps, one of the areas of geranium culture, is rich and alluvial, whilst in Algeria the soils concerned are gravelly or sandy.

The ground should be worked from 1 to 1½ ft. deep, the depth increasing with the dryness of the climate; deep digging lessens the need for watering.

Unless the land is very rich in humus, a dressing of well decomposed manure or some organic fertilizer is applied in autumn during the preparation of the ground, in addition to super-phosphate, basic slag and potassium salts.

A little sulphate of ammonia should be applied before planting, one third before the plants are put in and the rest in two applications during the early stages of growth. Very little else but oil-cake is

used in the Maritime Alps ; this is applied at the rate of 3000 kilos [1 kilo=2.20 lbs.] to the hectare [2.471 acres].

In Algeria, where cultivation extends over several years, 30,000 kilos of manure are worked in during the preparation of the ground and in the following years 300 kilos of dried blood or oil cake, 400 kilos of superphosphate and 150 kilos of potassium sulphate are used as a dressing.

It has been found that whilst the use of organic manure alone gave 30 quintaux [1 quintal=220.54 lbs.] of flowers and 1.9 per cent. of essential oil, the addition of superphosphate increased the yield to over 40 quintaux, and the essential oil to 3.17 per cent.

The organic manure was dug in at the rate of 150 quintaux and the superphosphate at the rate of 4 quintaux per hectare ; both were applied the first year. The yields noted were those of the second year.

In Réunion the application of 1000 kilos of superphosphate is advised if the soil is sufficiently rich in humus, and as lime helps in the production of essential oil, basic slag might be used to advantage.

Early planting gives the best results ; in the Maritime Alps and Corsica this is carried out as soon as the danger of frosts is past, and in Algeria when the cuttings show signs of rooting in the nursery.

Spacing is governed by various factors, such as the length of time the plants will occupy the field, the growth likely to be made, richness of the soil, the manure used, the watering, and the climate.

In warm countries, if the young plants are allowed too much space, they are unable to prevent excessive evaporation from the surface soil and there is a tendency for the production of woody tissue at the expense of the leaves. Various planting distances are in use, varying with the locality. In the rich soil of the Maritime Alps plants are set 80 by 80 cms. apart, or 60 by 70 cms. in land which can be watered, giving 15-16,000 or 16-25,000 plants per hectare respectively. The higher yield applies only to soils that are deep and friable.

There are also instances of plants set a metre apart ; this gives 10,000 to the hectare. At Erbalunga in Corsica they are set from 30-35 cms. apart. They must be planted firmly, and a knotted line used to ensure regular spacing. Some recommend that the roots should be allowed to dry a little before planting. After a month or so any failures should be replaced with similar sized plants and weeding must be commenced. Weeds are very harmful to the young plants and develop especially round the roots, so they must be removed by hand.

The last weeding must be done when the plants are about to cover the ground completely.

A system of fortnightly watering, starting from July, is the only way to ensure a good harvest. After each watering the ground should be hoed and again after the harvesting.

If cultivation lasts for many years, fertilizers which decompose slowly and potassic manures should be applied in autumn. The stems, and especially the new growths, should be earthed up, and in spring, when growth commences, the ground may be hoed and dressed with quickly assimilated manures, such as sulphate of ammonia and nitrates.

J. H. T.

The Coconut.*—Previous editions of this work were reviewed in the Kew Bulletin (*K.B.* 1921, 288 and *K.B.* 1914, 396). The book is based largely on the investigations carried out in the Philippines by the author and his colleagues and applies specially to the cultivation of the coconut in those islands. The expansion of the Philippine coconut industry, since the first edition was published in 1914, bears ample testimony to the value of the work on which this book is based.

The present edition has been revised, more especially the chapter devoted to diseases and pests. Literature connected with recent research on the coconut palm is freely quoted, in particular that which has been done in Malaya, Ceylon and the Philippines since the last edition was published.

In this edition, both in the title and the text, the author has adopted the more generally used method of writing the word coconut.

Flora of Tropical Africa.—In ascertaining the priority of publication of new names it is essential to know the exact dates of publication of books and journals. For this reason the dates of publication of the parts of Volume IX of the Flora of Tropical Africa are recorded below :—

- Part 1. July 1st, 1917.
- „ 2. January 29th, 1919.
- „ 3. June 24th, 1919.
- „ 4. August 5th, 1920.
- „ 5. August 12th, 1930.

**The Coconut*, by Edwin Bingham Copeland. Third Edition, revised pp. xviii + 233, with 28 illustrations. Macmillan & Co., Ltd., St. Martins Street, London, 1931. Price £1.

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